

june  
1956

## MACHINE AND TOOL

# blue book

### IN THIS ISSUE:

Deep Hole Drilling at  
Douglas Aircraft

Flex Wheels Save  
You Money

Planning a Safety  
Program



a hitchcock  
publication

ANNOUNCING BLUE BOOK CONTEST WINNERS  
page 105

CONTENTS ON PAGES 5 AND 6



## **THIS is No Ordinary Power Hack Saw Blade**

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge.

With a MARVEL Blade, you can cut any material—from the free machining steels to the toughest alloys . . . fast, accurately and economically.

You can tension a MARVEL Blade from 200% to 300% tauter than any ordinary blade, permitting much higher speeds and heavier feeds without deflection or breakage.

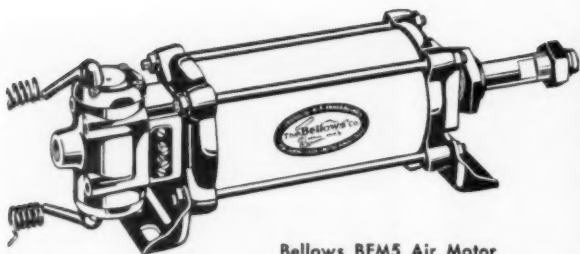
Like all good things, attempted copies of the MARVEL Blade have been numerous, but its performance has been *unequalled* by any of the imitators. Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

Write for latest cutting tool Bulletin and the name of your nearest MARVEL Distributor.



FB-1020

**ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.**



Bellows BEM5 Air Motor

## WHY YOU SHOULD BUY the AIR CYLINDER with the Built-in Valve

When it comes to down-right value, the Bellows Air Motor (the air cylinder with the built-in valve) tops them all for both standard air cylinder operations or as a component in new design applications. Not only are you buying a precision-built power unit—but you are buying a complete power unit. No extra valves to buy—dual speed control valves as well as directional valve are integral with the cylinder; no cumbersome, complex piping to install—a single, flexible air hose is all the hook-up you'll need.

You can have your choice of built-in directional valves: 110 volt or 8 volt electrical control, standard or explosion-proof, manual control, or air poppet valve control. Five bore sizes: 1 1/4", 1 3/4", 2 1/2", 3 3/8", and 4 1/2" Any stroke length.



### WRITE FOR THESE TWO BULLETINS:

Contain full data and specifications on Bellows Air Motors. Free. Address Dept. MTB-656 The Bellows Co. Akron 9, Ohio. In Canada: Bellows Pneumatic Devices of Canada, Ltd., Toronto.

**The Bellows Co.**  
AKRON 9, OHIO

1109A.



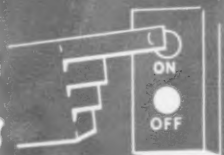
**IT IS EASIER  
TO INSTALL**



**IT TAKES  
LESS SPACE**



**ITS ACTION  
IS FASTER**

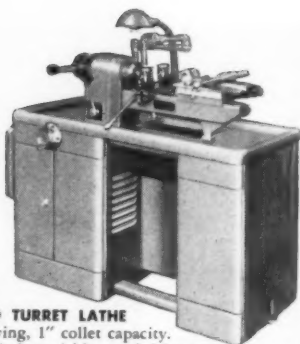


**IT IS EASIER  
TO CONTROL**



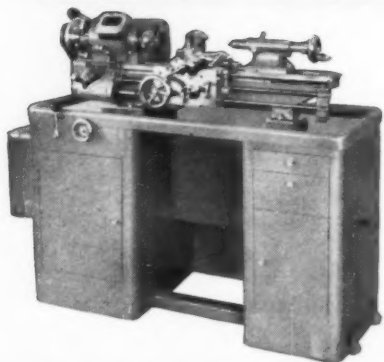
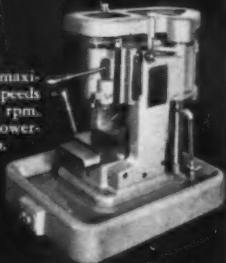
### 73 HAND TURRET LATHE

7" swing, 1" collet capacity.  
Infinitely variable speed drive provides spindle speeds from 100 to 3500 rpm.



### 45P PROFILER

Collet capacity  $\frac{1}{8}$ " maximum. 8 spindle speeds from 437 to 7000 rpm. Spindle and follower-spindle 1-to-1 ratio.



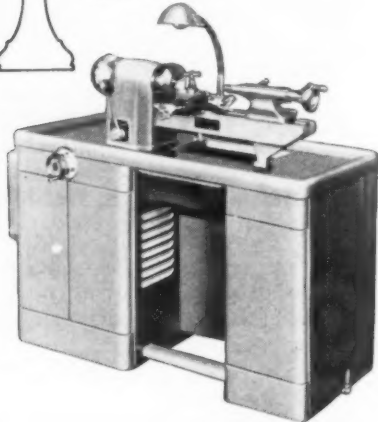
### 8A TOOLMAKERS LATHE

8 1/2" swing, by 24" between centers. Variable speed drive provides infinite range of spindle speeds, 32 to 2000 rpm.



### 73 STANDARD LATHE

7" swing, 1" collet capacity. Infinitely variable speed drive provides spindle speeds from 100 to 3500 rpm.



**YOUR BEST MOVE**  
is to

# Wade®

51 River St.

## THE WADE TOOL CO.

WALTHAM 54, MASS., U.S.A.

MAKERS OF  
PRECISION TOOLS FOR  
AMERICAN INDUSTRY

Circle No. 202 on Card, Opposite Page 65

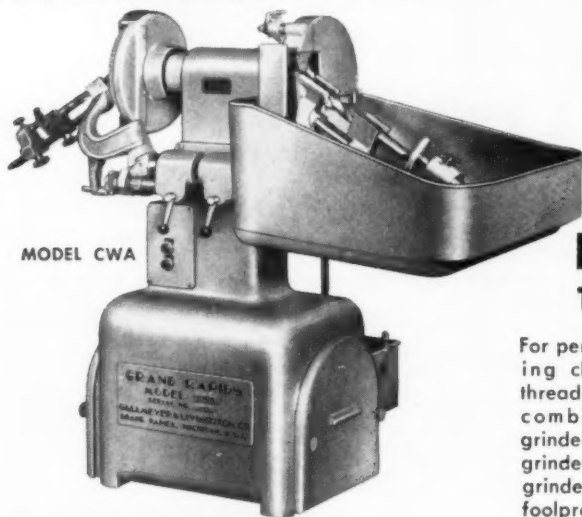
MACHINE and TOOL BLUE BOOK

# NO GUESSWORK! NO COMPLICATED SETUPS!

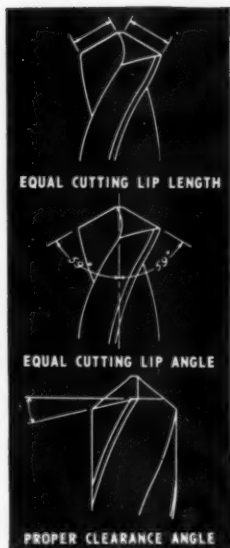
WITH **GRAND RAPIDS** DRILL GRINDERS

BY *Hammond* OF KALAMAZOO

— save time and money . . . conserve skilled labor . . . keep your twist drills factory sharp . . . produce perfect points automatically . . . with the well known GRAND RAPIDS double-end drill grinders. The only adjustment (made in seconds) is that of tailstock to accommodate length of the drill. GRAND RAPIDS drill grinders have proved themselves in thousands of leading plants the world over.



MODEL CWA



## **GRAND RAPIDS** **TAP GRINDERS**

For perfectly ground taps assuring clean, sharp, accurate threads use a GRAND RAPIDS combination drill and tap grinder, or a single-purpose tap grinder. GRAND RAPIDS tap grinders set the standard for fast, foolproof, correct tap grinding.



**WRITE FOR FREE LITERATURE**

1614 DOUGLAS AVE., KALAMAZOO, MICH.

# ARMSTRONG



*Quality*  
**TOOLS**



*Not a cost, but an investment  
that pays year after year*

Buy **ARMSTRONG TOOL HOLDERS** and **TOOLS** for today's job and they will bring you added profits thru the years. With **ARMSTRONG TOOL HOLDERS** you will be permanently tooling up for whatever comes, for each is a multi-purpose tool that takes cutter-bits ground to many shapes. Each is an efficient tool, refined thru a half century of world wide use. Each has strength beyond any need, extra strength resulting from endless research and the most modern closely controlled manufacturing methods.

**ARMSTRONG TOOL HOLDERS** are inexpensive, for they are produced in great numbers. They are instantly available because they are carried in stock by all leading supply houses in sizes and types for every operation on lathes, planers, slotters and shapers; for standard operations on turret lathes and screw machines. They are profitable in use because they permit the highest speeds and heaviest feeds, and "Save: All Forging, 70% Grinding and 90% High Speed Steel."

**ARMSTRONG Lathe and Milling Machine Dogs** are permanent tools too. They are drop-forged from special open hearth steel, are heat treated to extreme stiffness and toughness. They have alloy steel screws hardened at the tip to prevent up-setting and have double life, for hubs are made oversize to permit re-tapping.

**ARMSTRONG** Quality pays over and over again. It offers many opportunities to conserve profits.

**ARMSTRONG BROS. TOOL CO.**

*"The Tool Holder People"*

**5208 W. ARMSTRONG AVENUE • CHICAGO 30, ILL.**

Circle No. 204 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

# READER'S GUIDE

MACHINE AND TOOL

**blue book**

JUNE, 1956

VOL. 51 - No. 6

FEATURES THIS MONTH .....	83
AS THE EDITOR SEES IT .....	85
LETTERS TO THE EDITOR .....	87
ROUND-UP OF WASHINGTON NEWS .....	91

## **Contest Winners**

Winners Announced in Blue Book's \$2,500 50th Anniversary Production Contest	<b>105</b>
--	------------

## **Safety**

Case Study of a Safety Plan in Action, BY LEONARD C. SCHMIDT	<b>110</b>
--	------------

## **Presses**

1-Ton Hydraulic Press Solves Small Parts Assembly Job	<b>114</b>
---	------------

## **Grinding Flex Wheels**

How to Cut Costs with Reinforced Flexible Wheels, BY RICHARD C. BUSH	<b>116</b>
--	------------

## **Lathe Turning**

Tracer Controlled Lathe and Carbide Tooling Ups Production 400%	<b>120</b>
---	------------

## **1906 Advertisers**

BLUE BOOK Salutes Its 1906 Advertisers BY D. M. CARLSON	<b>124</b>
---	------------

## **Deep Hole Drilling**

How Douglas Aircraft Solved Its Deep Hole Drilling Problems, BY A. R. FELANDO	<b>132</b>
---	------------

## **Flame Hardening**

The Horizons Are Widening for Flame Hardening, BY M. R. SCOTT	<b>148</b>
---	------------

## **Numerical Cam Miller**

Installation of a Numerical Cam Miller In Britain	<b>161</b>
---	------------

## **Labor Arbitration**

Right or Wrong in Labor Relations	<b>175</b>
-----------------------------------	------------

continued

**BPA**

Accepted as Controlled Circulation Publication at Pontiac, Illinois  
Copyrighted, 1956, by the Hitchcock Publishing Company,  
222 E. Willow Avenue Wheaton, Ill.

**SEE  
NEXT  
PAGE**

## Reader's Guide

continued

### Shop Hints

Indexing Milling Fixture Built Around Standard Collet .....	167
Protective Housing in Cut-Off Saw .....	168
Notched Drill Breaks Burrs .....	170
Miking Uneven Fluted Drills, Counterbores, End Mills .....	170
Swing Clamping Fixture .....	172

### Departments

Meetings, Conventions, Exhibitions .....	100
News of Automation .....	161
Right or Wrong in Labor Relations .....	175
Free Literature .....	185
News of the Industry .....	195
What's New in Metalworking? .....	203
Mechanics Through the Ages .....	324
The Market Place .....	326
Products Index .....	327
Index to Advertisers .....	332

### Editorial Staff

W. F. SCHLEICHER, vice-president and editorial director; P. A. MELINE, managing editor; D. M. CARLSON, assistant editor; E. McDANIEL, associate editor; F. M. FREDRICK, editorial assistant; L. C. LeCOMPT, readers' service; H. O. ERICKSON, Research Manager.

### Editorial Advisory Board

M. JOHN AHLSTROMER, asst. chief engineer, Chicago Screw Co.; RONNIE BURRITT, factory manager, J. J. Tourek Mfg. Co.; JOHN V. CARLSON, gen'l. supt., Union Special Machinery Co.; R. T. CARLSON, supt., NRK Mfg. & Eng. Co.; ROGER FARDIG, supt., B. F. Gump Co.; ED FLUSKEY, Consulting Eng., Revere Camera Co.; HOMER F. GRIFFITH, asst. works mgr., Ind. Power Div., International Harvester Co.; JOE KOSINSKI, works mgr., Scully-Jones & Co.; PAUL PRIKOS, vice pres., Prikos & Becker Tool Co.

### Business Staff

R. C. VAN KAMPEN, president; VINCENT C. HOGREN, executive vice president; J. E. HITCHCOCK, HENRY J. SMITH, DAN E. REARDON, JAMES C. STEWART, vice-presidents; M. L. YONTS, secretary and production manager; OLIVER S. PEPPER, business mgr.; L. M. SCHROEDER, art director; R. L. SPRECKELS, circulation manager.

Hitchcock District Managers are Listed on Page 64.

### MACHINE AND TOOL BLUE BOOK

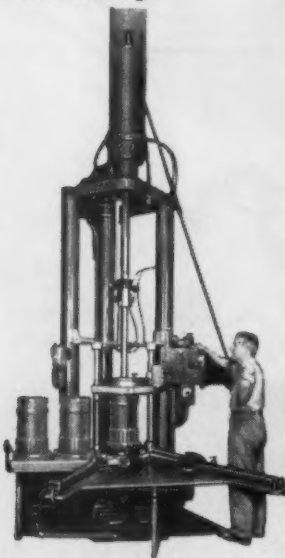
Subscription rates: \$5.00 per year in U.S.A. \$6.00 per year elsewhere.

So you think we're just talking?

**But**

**FULMER CAN HONE IN 40 MINUTES  
JOBS FORMERLY GROUND  
IN 16 HOURS!**

The same  
unbelievable  
savings can be  
**PERFORMANCE-  
GUARANTEED**  
on internal  
bore honing.



The replacement of conventional bore finishing methods with Fulmer Precision-Honing usually brings time and cost savings that, at first glance, appear unbelievable! Production estimates by Fulmer engineers are based on long experience and calculated by a positive mathematical formula which is consistently proved accurate.

FULMER Precision-honing of internal bores is a stock-removing process in which abrasive stones are applied under controlled pressure to produce a round and straight bore to accuracy as close as .0001 ( $\pm$ ) in. It removes as much as 1/16 in. from the diameter at rates up to 1½ cu. in. per minute. Chip curls as long as six inches demonstrate the stock-removing properties of the Fulmer honing process. Fulmer precision honing of internal bores assures amazing savings. Other finishing methods are now "old fashioned" — Why not get up to date? Write for bulletin on honing to: C. Allen Fulmer Co., Dept. B, 107 E. 4th St. Cincinnati 2, Ohio



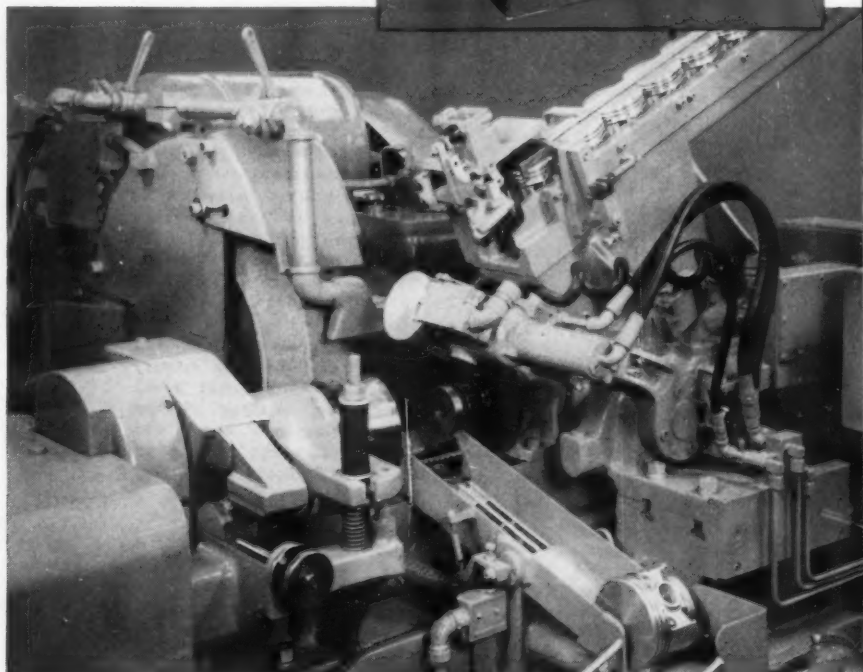
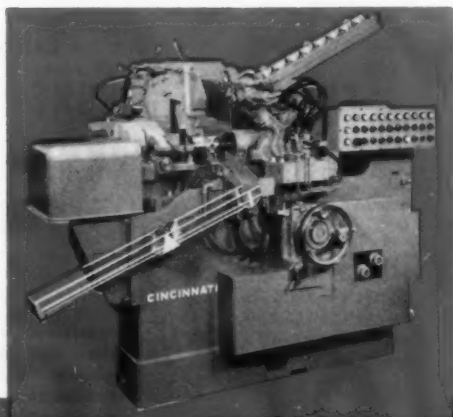
**FULMER** honing equipment

# Fully Automated Cincinnati

Grinds 130 automotive

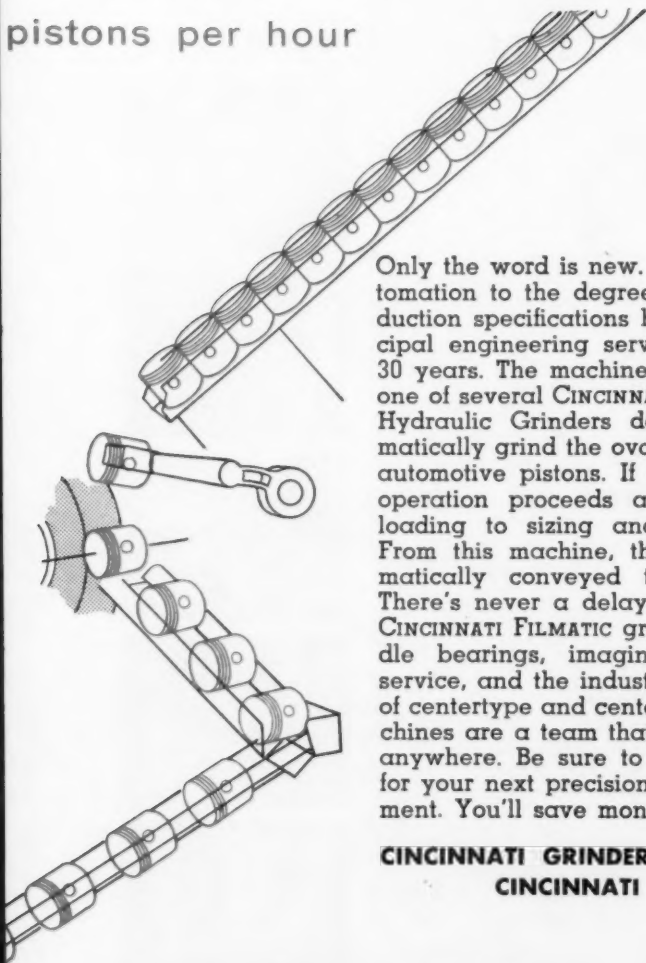


Oval skirt diameter is ground on 130 pistons per hour, on this CINCINNATI® FILMATIC Automatic Centertype Grinding Machine. Close-up shown below.



# Centertype Grinding Machine

pistons per hour



Only the word is new. At Cincinnati, automation to the degree required by production specifications has been our principal engineering service work for over 30 years. The machine illustrated here is one of several CINCINNATI® FILMATIC Plain Hydraulic Grinders developed to automatically grind the oval skirt diameter on automotive pistons. If desired, the entire operation proceeds automatically, from loading to sizing and wheel dressing. From this machine, the parts are automatically conveyed to the next unit. There's never a delay in production, for CINCINNATI FILMATIC grinding wheel spindle bearings, imaginative engineering service, and the industry's widest variety of centertype and centerless grinding machines are a team that just can't be beat anywhere. Be sure to consult Cincinnati for your next precision production equipment. You'll save money by doing so.

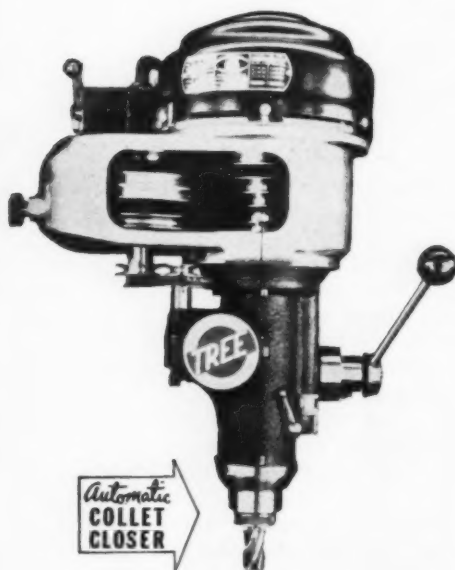
**CINCINNATI GRINDERS INCORPORATED**  
**CINCINNATI 9, OHIO**

# CINCINNATI



**CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES**  
**CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES**

# do you need . . . VERTICAL MILLING CAPACITY?



You can add vertical milling capacity by adapting the versatile TREE MH-4 Vertical Milling Attachment to your present horizontal milling machine. The MH-4 gives you all angle milling, drilling and boring with a high degree of accuracy because of its built-in rigidity. Spindle — alloy steel, hardened and ground Roller drive eliminates back-lash. Quill — 4 inch travel. Enclosed micrometer depth stop. Power feed. Write today for full information.

Cincinnati



Nichols



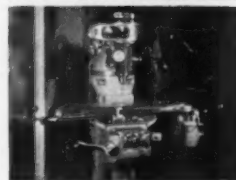
Kempsmith



Milwaukee



Bridgeport



EXPORT ADDRESS: States Trading Co., 401 Brdwy., New York 13, Cable Address: "STRADESO"

**TREE TOOL AND DIE WORKS**  
1600 JUNCTION AVENUE RACINE, WISCONSIN



## *little* **GIANT**

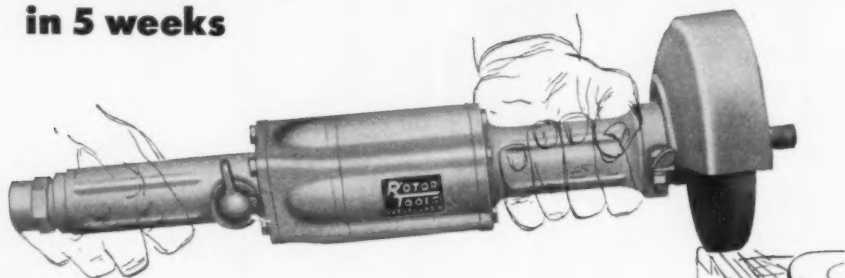
The Gray planer Cub has all of the characteristics of its renowned king-size family of production giants: lightning speed-brute power-tremendous rigidity. Heavy carbide planing is effortless. Built for high production with great precision, its Gray exclusive engineering features will prove to you that

*Quality doesn't cost . . . it pays.*

The G. A. GRAY Co., Cincinnati, Ohio

# DOUBLES OUTPUT

**New Rotor D-6 Air Grinder pays for itself  
in 5 weeks**



**JOB:** Removing flash and parting lines from steel castings. Tool used 50% of production time.

**FORMERLY:** Used 6" electric grinders at 3700 rpm. Required 10 minutes per casting.

**NOW:** Using New Rotor D-6 Air Grinders at 6000 rpm. Job time cut to 5 minutes.

**RESULTS:** Output doubled. Savings paid for new Rotor Grinder in 5 weeks. Wheels last longer. Tool is 5 lbs. lighter, easier to handle.

A demonstration on *your* work will show how *you* can improve production with these new Rotor Grinders. Ask for proof.

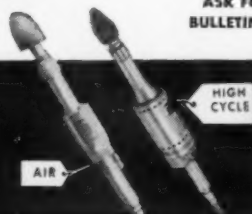


After 5 weeks,  
it's pure  
savings!

ASK FOR  
BULLETIN 44

THE **ROTOR TOOL** CO.  
CLEVELAND OHIO

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEM



**EASY TO INSTALL**

**SIMPLE TO OPERATE**



## highly sensitive electronic control unit

*controls quality  
during actual  
processing*

**CONTINUOUS GAGING  
OR  
MOMENTARY GAGING**

**CONTINUOUS  
OPERATION**

**SHOCK MOUNTED  
CASE**

**STANDARD  
INDUSTRIAL  
ELECTRON TUBES**

### **SENSING ELEMENTS ARE BUILT INTO THE GAGE HEADS**

To provide automatic measuring such as gaging and sorting, weighing, pressure control, fatigue testing, inspection, and thickness control.

### **AMAZING SENSITIVITY IS BUILT INTO THESE UNITS**

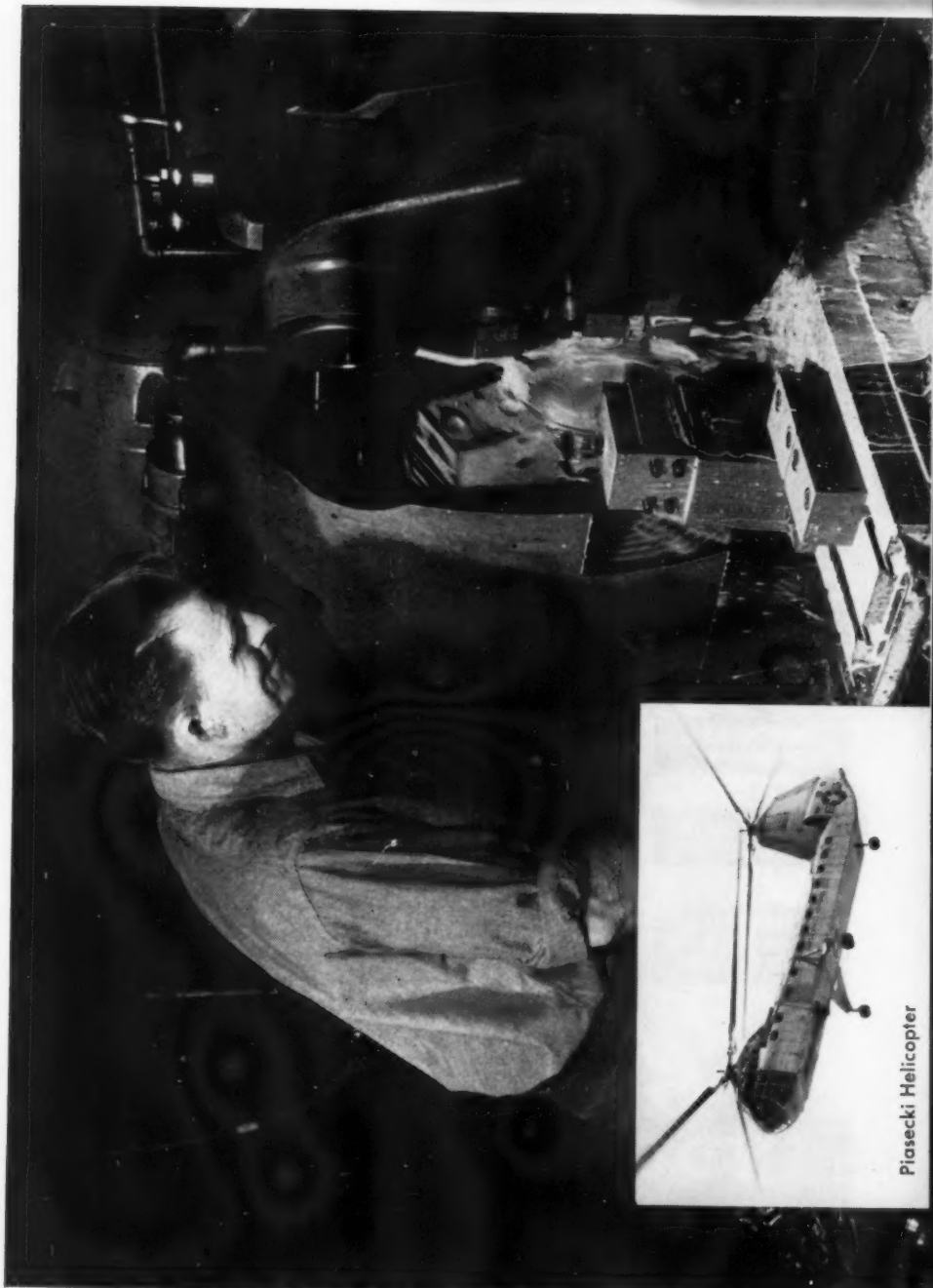
Using standard Industrial Electronic Gage Heads this system of measurement provides four linear full scale displacement ranges from plus or minus .0001 inch to plus or minus .100 inch. Each range is divided into 20 scale divisions on the meter. Dimensional variations of five millionths of an inch are detectable when required.

### **CONTROL IS PROVIDED BY MEANS OF 2 POWER RELAYS**

They can be adjusted to operate at any desired control point on the meter, and on any one of the 4 sensitivity ranges; on plus or minus tolerances; on 2 successive plus tolerances; or on 2 successive minus tolerances. All initial adjustments are made inside the unit. These units require no other attention during operation—and the panels can be locked to prevent tampering.

# **INDUSTRIAL** electronics, inc.

8060 WHEELER STREET • DETROIT 10, MICHIGAN



Piasecki Helicopter

# Sun's Heavy Duty Emulsifying Cutting Oil excels on high-alloy aircraft steels

S.E.C.O. Heavy Duty handles all machining jobs requiring an emulsifying cutting oil. Piasecki Helicopter's large job shop at Morton, Pa., found this out three years ago when S.E.C.O. HD\* replaced two expensive heavy-duty soluble oils in machining fan hubs.

Extremely versatile and moderately priced, S.E.C.O. HD has been doing an exceptional job in cutting a variety of high-alloy aircraft steels for Piasecki.

For more information about S.E.C.O. HD, see your Sun representative. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-6.

## WRITE FOR

### FREE TECHNICAL INFORMATION

- Cutting and Grinding Facts
- Disposal of Waste Emulsions
- New Improved S.E.C.O.
- S.E.C.O. — Mixing Instructions
- S.E.C.O. HD



\*TRADE-MARK

INDUSTRIAL PRODUCTS DEPARTMENT

# SUN OIL COMPANY

© SUN OIL CO.

Philadelphia 3, Pa.

IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

Circle No. 211 on Card, Opposite Page 65

# **3 INGERSOLL CUTTER GRINDERS**

**SERVICING**

**\$2,000,000  
IN MACHINE TOOLS**





Ingersoll makes sure that its \$2,000,000 investment in milling machines pays maximum returns in production. This "guarantee" is provided by 3 new-design Ingersoll Cutter Grinders which cost a total of only \$15,000. These 3 units service a group of 8 big mills and 6 knee-type machines in Ingersoll's plant, sharpening 552 different inserted-blade face mills, slotting cutters and boring heads. Production limits are often set in the grinding room. Don't jeopardize the performance of expensive machine tools by not having enough good cutter grinders. Examine your grinding room equipment now and replace old and inadequate units with fast and accurate Ingersoll Cutter Grinders.



WRITE TODAY  
for Cutter  
Grinder  
Manual 64E

# THE INGERSOLL

MILLING MACHINE COMPANY  
ROCKFORD, ILLINOIS, U. S. A.

BUILDERS OF SPECIAL DESIGN MILLING & BORING MACHINES  
ORIGINATORS OF *SHEAR CLEAR* CUTTERS

Circle No. 212 on Card, Opposite Page 65



*In your*

**MORSE  
COBALT  
TOOLS**

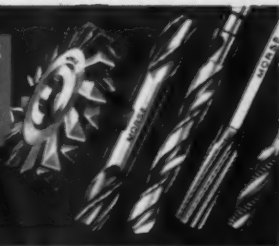
territory and any territory...

the top **ISD**  
(the man we deal with exclusively)

is the **MFD**  
(your Morse-Franchised Distributor)  
the man with "The Most"

Here's why  
means **"THE MOST"**  
(World's Most Complete Line of)  
Finest Quality Tests

**MORSE  
HIGH  
SPEED  
TOOLS**



and now  
**MORSE  
CARBIDE  
TOOLS**



TWIST DRILL & MACHINE CO., NEW BEDFORD, MASS.  
(Subsidiary of VAN NORMAN INDUSTRIES, INC.)

Warehouses in New York, Chicago, Detroit,  
Dallas, San Francisco

Circle No. 213 on Card, Opposite Page 65

## A New Concept of Vertical Measurement

# The Webber Micro-Accurate OPTICAL HEIGHT GAGE

Employing TWO proven Principles of Precision Measurement...Webber Gage Blocks and the famed Leitz Measuring Microscope

Now, for the first time you can make vertical measurements up to 49" and be absolutely certain of their accuracy. No longer is special or expensive laboratory equipment needed. The workman himself can do his own inspecting, saving expense, speeding production and attaining an accuracy  $\pm .000005$ " per inch of length up to the full 49" of height.

### A Working Tool

The new Webber Micro-Accurate Optical Height Gage is not a laboratory instrument, although it has laboratory accuracy. Any workman having ordinary skill, can use it right on the job to transfer measurements from a surface plate, with accuracies hitherto unknown. The time-consuming task of wringing gage blocks together is eliminated. The new Optical Height Gage is simple to use, will speed production, vastly improve accuracy . . . save money.

In 25", 37" and 49" models.

Next to your gage blocks, the new Webber Optical Height Gage will be the most useful tool in your shop.

**Webber**  
**GAGE COMPANY**

12905 Triskett Rd. • Cleveland 11, Ohio

**LARGEST EXCLUSIVE MANUFACTURER OF PRECISION GAGE BLOCKS**

Circle No. 214 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

# now...

## VALUABLE DIE-SET DATA FOR ALL TOOL ENGINEERS

It's easy-to-look-at! More than 200 pages are specially edited and arranged for quick and simple reference. Full color is used to make tables easier to read, illustrations more clear. The easy-to-look-at format plainly indicates all optional features. Covering the complete Danly "Leadership Line", this catalog presents full dimensional data and specifications for all Danly Die-Sets, Diemakers' Supplies, Bolster Plates and Bolster Plate Accessories. Get your copy of this new easy-to-look-at Danly catalog. *Write for it today.*

**EASIER SELECTION—  
MORE COMPLETE DESIGN INFORMATION**



WRITE FOR YOUR FREE COPY TODAY!

**DANLY**

DIE SETS AND  
DIEMAKERS' SUPPLIES

DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Ave., Dept. F, Chicago 50.

# *Pru*tton

THREAD  
ROLLING  
MACHINERY

## HOW TO BREAK ALL PREVIOUS PRODUCTION AND COST RECORDS ON YOUR THREADED PARTS!

Pru

tton, Exclusive Planetary Die System, Thread Rolling Machines with high-volume hopper feed are breaking all records (UP TO 50,000 PCS. PER HOUR) on thread rolling, roll forming, knurling, marking, serrating and necking.



For instance, on the typical threaded and formed parts shown above, Prutton Thread Rolling Machines are setting unprecedented records such as 9,000 Tubing Nuts per hour; 6,000 Speedometer Worms per hour; and up to 25,000 pcs. of various Threaded Bolts, Screws, Hollow Work Parts, Wood Screws, and as high as 50,000 nails per hour.

Let us demonstrate how Prutton superiority can work for you. Submit your parts for our recommendations. No obligation, whatsoever.

## **Pru**tton Corporation

5296 WEST 130th ST.

CLEVELAND 30, OHIO

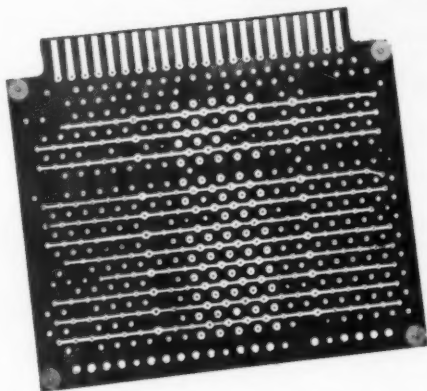
Circle No. 216 on Card, Opposite Page 65

# TRACER-GUIDED DRILLING

100 HOLES P. M.

WITH NEW HERMES *Engravo*graph

*for printed circuit plates*



Pneumatic attachment with adjustable feed gives high speed production.

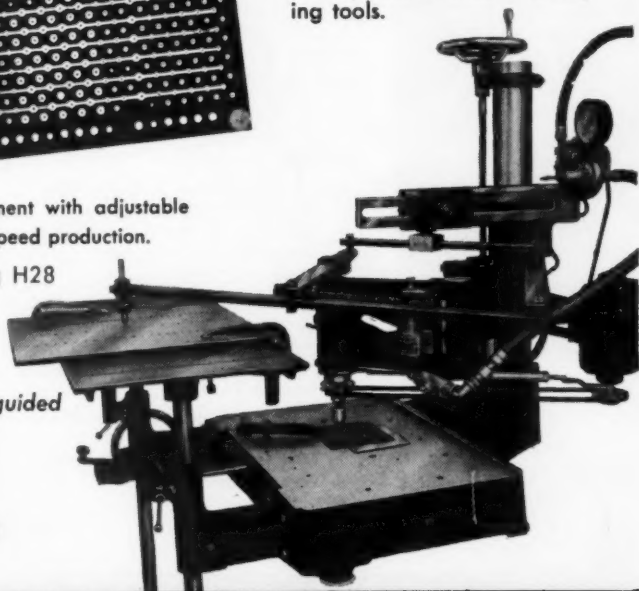
Ask for catalog H28

Also for tracer-guided

**ENGRAVING  
PROFILING  
GRADUATING**

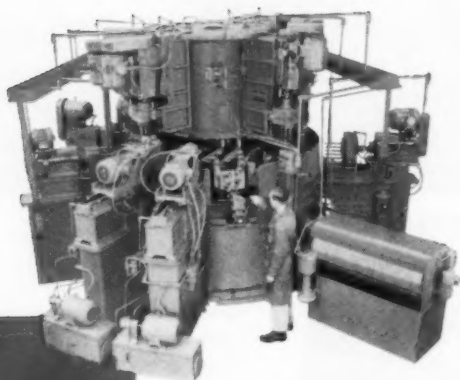
- Pantograph reproduces drill pattern from template in any reduction ratio — assuring high accuracy.

- Allows drilling and routing of different size holes in one operation without changing tools.



*new hermes* ENGRAVING MACHINE CORP.

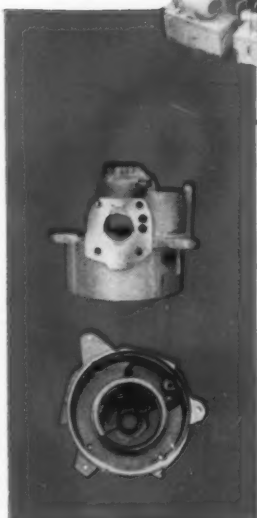
13-19 University Place, New York 3, N.Y.



**18**  
STATIONS

**47**  
OPERATIONS

**120**  
PARTS/HOUR



**T**HIS intricate production giant is also a triumph in metal-working flexibility. Designed for a leading appliance manufacturer, the MORRIS Model 334-S High Production Machine processes one-cylinder or two-cylinder housings at the rate of one every 30 seconds.

Yet there's no model change-over problem! The MORRIS completely automatic "special" machine uses a MORRIS basic center column machine equipped with an 84" dia. table, an 18-station automatic hydraulic index, and MORRIS Unit-Type Machine Tools.

A total of 47 spindles, mounted on three 8-inch way type units, six No. 2 CAM-MATIC Drill Units and eight AIR-OIL-MATIC Drill Units, are used to mill, drill, counterbore, spot face, bore, ream and tap housings.

The result . . . a "special" machine at a fraction of the usual special machine cost . . . accurate, flexible, fast!

*Investigate the production-boosting and cost-saving advantages of MORRIS Unit-Type High Production Machine Tools.*

**WRITE TODAY** for detailed literature, or outline your production problem for analysis by MORRIS engineers.

- 1.....LOAD 1 PART
- 2H.....MILL 1 SURFACE
- 3H.....FINISH MILL 1 SURFACE
- 4V.....DRILL AND BURR 1 HOLE
- .....DRILL AND COUNTERBORE 4 HOLES
- 5H.....DRILL 4 HOLES
- .....DRILL AND BURR 1 HOLE
- V.....DRILL 2 HOLES
- 6V.....BURR 2 HOLES
- .....REAM 1 HOLE
- 7H.....SPOT FACE 3 PLACES
- .....DRILL AND BURR 1 HOLE
- V.....DRILL 1 HOLE
- .....MILL .250 RADIUS
- 8V.....REAM 1 HOLE BURR 1 HOLE
- .....BURR .250 MILLED RADIUS
- 9A.....MILL 1 SURFACE
- H.....DRILL AND BURR 4 HOLES
- .....REAM 1 HOLE

- 10.....The angular operation at Station 9
- 11.....utilizes those two stations as well.
- 12V.....TAP 1 HOLE
- A.....DRILL FOR REAMING
- 13V.....ROUGH BORE CYLINDER DIAMETER
- 14V.....SEMI-FINISH BORE AND CHAMFER CYLINDER DIAMETER
- 15H.....TAP 4 HOLES
- V.....FINISH BORE CYLINDER DIAMETER
- 16V.....CHAMFER BOTTOM OF BORE WITH RECESSING TOOL
- 17V.....TAP 5 HOLES
- 18.....Station 18 is reserved for additional operations for future part changes.

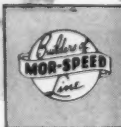
**Operations:** H—Horizontal  
V—Vertical  
A—Angular



THE MORRIS MACHINE TOOL CO.

937 HARRIET STREET

CINCINNATI 3, OHIO



*Morris*

**EASY ACCESS TO ALL TOOLS** . . . result of center column construction and mounting of horizontal units on pedestals.

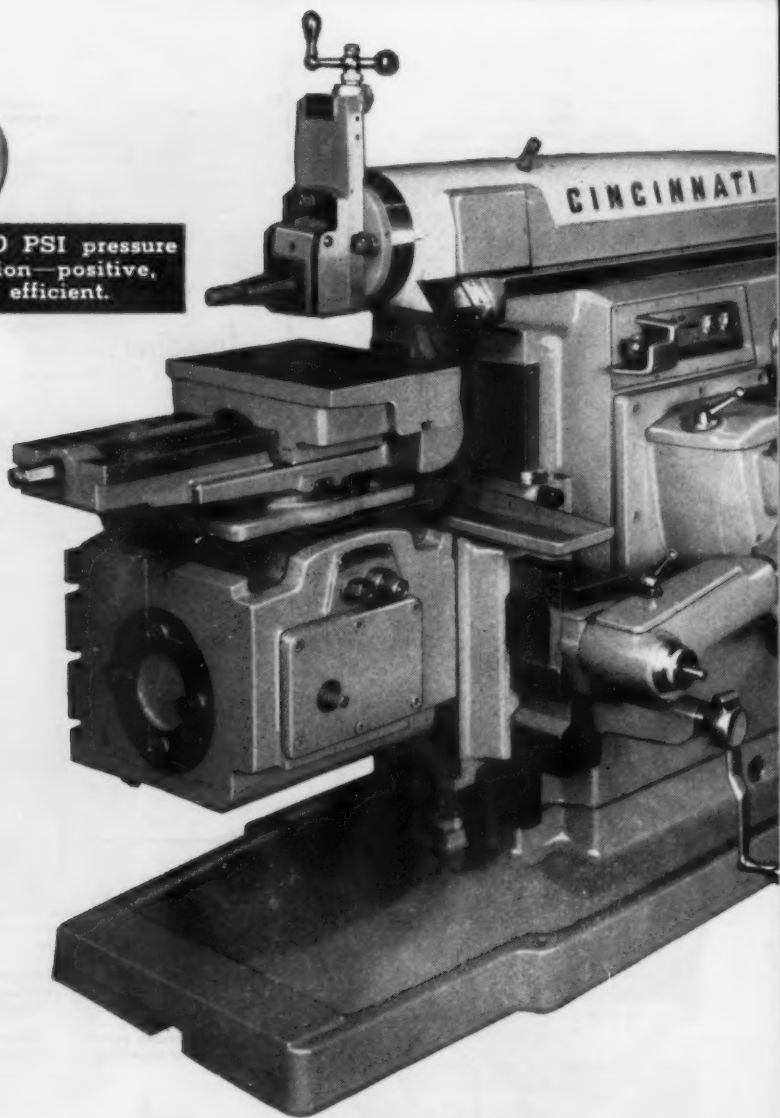
**EXPANDING ARM** . . . utilized by fixtures to locate part with respect to previous roughing operation.

**FINISH MILLING CUTTER** . . . raises on return stroke to eliminate return stroke tool mark.

Circle No. 218 on Card, Opposite Page 65



Modern 50 PSI pressure  
lubrication—positive,  
safe, efficient.



Modern brushless electro-magnetic brake  
and clutch—no adjustment required.





Modern nodular iron slot-free ram for greater accuracy.

# CINCINNATI RIGID SHAPERS

Rigidity thru advanced design of column, ram, vise and trunion permit smooth heavy cuts on these modern Cincinnati Rigid Shapers.

The most modern controls and oiling system give speedy performance and easy and positive operator control.

Furnished in 16' to 36' capacities.

WRITE FOR THE NEW DESCRIPTIVE  
BULLETIN.

## THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES



a **NEW** way...  
to drive screws...to run nuts...

**BUCKEYE**  
positive  
torque limiting  
**FASTENING**  
**TOOLS**



**MAINTAIN UNIFORM  
TIGHTNESS**—adjusts to any torque from 5 to 85 in./lbs.

Set the torque—just once—at any point between 5 and 85 in./lbs., and this Buckeye Torque Limiting Fastening Tool is ready to go! Apply the tool to the work—it sets itself for driving—AUTOMATICALLY . . . and it stays set even if you vary the pressure on the tool. The instant the screw or nut hits home, and that preset torque is reached, the tool clutch disengages—AUTOMATICALLY, even if the operator maintains pressure on the tool. Now, remove the tool from

the work and it will re-set itself—AUTOMATICALLY.

Simple. Foolproof. Every fastener is just as tight as the one before. The work-piece doesn't get scratched or damaged. The fasteners won't strip or shear. And your bits and sockets will last longer, too.

If you aren't doing your fastening work this NEW way, with a Buckeye Torque Limiting Fastening Tool, better write—NOW—for complete information. Better still, why not ask for an in-plant demonstration—there's no obligation.

**Buckeye Tools**  
CORPORATION

DIVISION 14 • DAYTON 1, OHIO

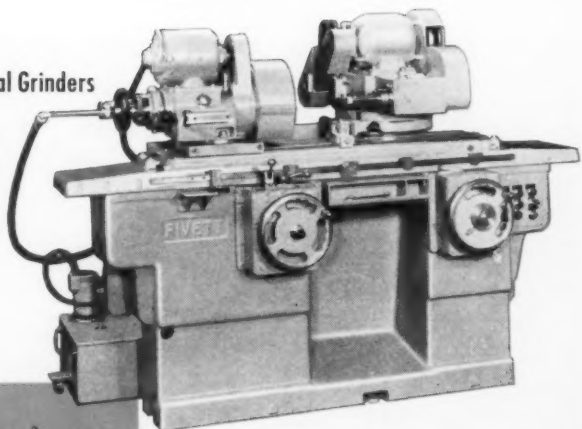
producers of  
the world's first  
successful  
rotary air tools

Circle No. 220 on Card, Opposite Page 65

# Set-up time reduced!

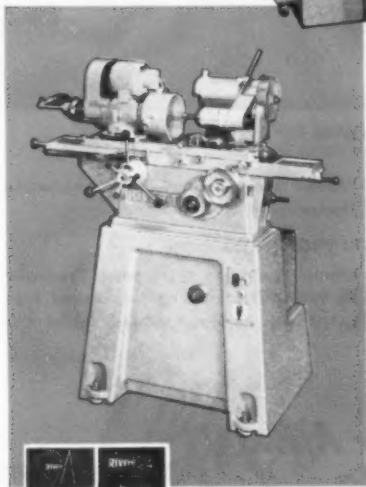
Rivett Internal and Universal Grinders

Lick Largest Cost Item  
in Toolroom and  
Small Lot Production



## Rivett 1024 Internal and Universal Grinder

Double-end wheelhead swivels 180°—permits rapid changes to external or internal work. Grinds holes  $\frac{1}{8}$ " to 9" dia. External grinding to 12" dia. up to 21" length. 12" standard swing may be increased to 14" or 20". Grinds straight, taper, two-angle, face and shoulder surfaces. Work may be held in collet, step chuck or jaw chuck; on face plate or between centers.



## Rivett 84 Internal-External Grinder

A small hole grinder with *flexibility*—mounts interchangeable wheelheads for quick conversion to external grinding. Hole capacity is 3" dia. with a max. depth of 4"; external to 3" dia. by 4" length. Collets and step chucks mount directly in lathe-type spindle, with lever closer for quick operation.

RIVETT LATHE & GRINDER, INC., BRIGHTON 35, BOSTON, MASS.

### Rivett Lathe & Grinder, Inc.

Dept. MTR6, Brighton 35, Boston, Mass.  
Please send: ☐ Catalog 1024B ☐ Catalog 84A.

Name \_\_\_\_\_

Company \_\_\_\_\_

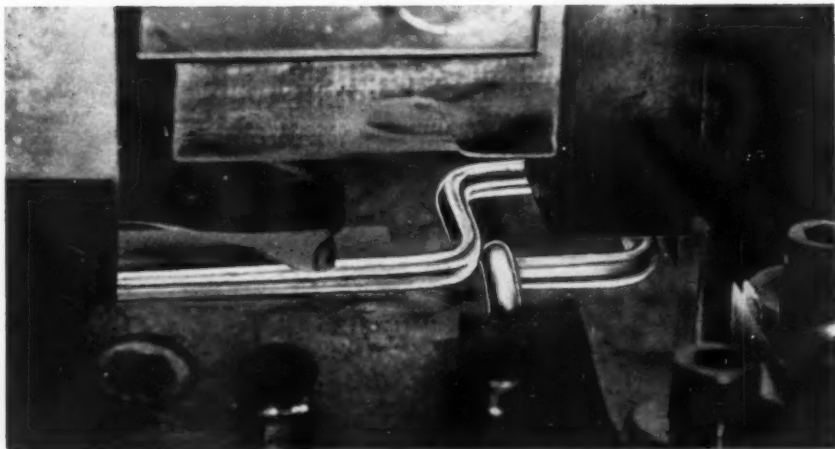
City \_\_\_\_\_ State \_\_\_\_\_

# RIVETT

Circle No. 221 on Card, Opposite Page 65

# NILSON 4-SLIDES PAY OFF 4 WAYS

- BIG PROFITS • BIG PRODUCTION
- BIG SAVINGS • BIG GAIN IN ACCURACY



Forming Operation: Meter Shunts of  $\frac{3}{16}$ " Wire Stock

## WHY NILSON IS TOPS FOR 4-SLIDES:

Nilson 4-Slides are built for rugged duty

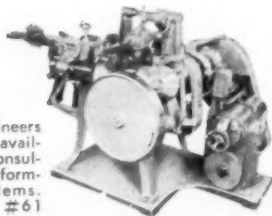
Form both ribbon metal and wire stock

Press capacities 8 to 75 tons, wire diameter to  $\frac{1}{2}$ "

16 Models Available, Including Combinations of Horizontal Press and 4-Slide

## YOU PROFIT BY:

Automatic Operation • Increased Production  
• No Secondary Handling • Improved Products • Fewer Rejects • Lowest Initial Cost



Nilson engineers are always available for consultation on forming problems. Bulletin #61 sent on request.

Nilson's 3 tilt and 3 stationary reels handle wire or ribbon stock coils up to 500 pounds.



1511 RAILROAD AVENUE, BRIDGEPORT 5, CONN.

Automatic Chain Making Machines • Staple Forming Machines • Wire and Stock Reels • Wire Straightening Equipment • Slide Feeds for Presses • Wire and Ribbon Stock Forming Machines

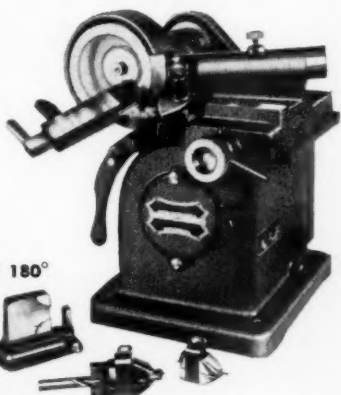
Circle No. 222 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

# Versatile!

THE

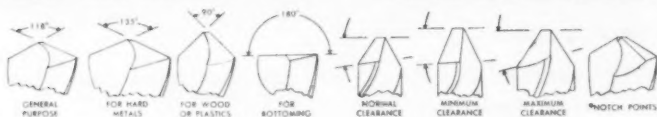
## NO. *Oliver* 21 DRILL POINTER



- CAPACITY— $3/32''$  TO  $1/2''$ . SPECIAL COLLET PERMITS GRINDING DOWN TO #57.
- INCLUDED ANGLES OF  $80^\circ$  TO  $180^\circ$  ARE READILY OBTAINABLE.
- CLEARANCES—SETTING GAGE PROVIDES ANY OF FOUR DIFFERENT CLEARANCES FOR CORRECT DRILLING.
- BUILT-IN DIAMOND WHEEL DRESSER.
- AVAILABLE IN BENCH TYPE OR PEDESTAL MODELS.

\*Modified #21 drill pointer available for adding notch points to heavy web drills.

Oliver #510 ( $1/4''$  to  $3''$  capacity) drill pointers and Oliver point thinning machines are also supplied.



Write for brochure or send drills for sample sharpening.

# Oliver

INSTRUMENT  
• COMPANY

1408 EAST MAUMEE



ADRIAN, MICHIGAN

FACE MILL GRINDERS • AUTOMATIC DRILL GRINDERS • DIE MAKING MACHINES  
TOOL & CUTTER GRINDERS • DRILL POINT THINNERS • TEMPLATE TOOL GRINDERS

# **JIFFY PADDED SHIPPING BAGS** *...in* **Colors**



Jiffy Padded Shipping Bags are now available on special request in a variety of colored kraft papers.

Personalized imprints in one or two-colors available.

Use **JIFFY BAGS** for shipping your semi-fragile and non-fragile merchandise, tools, replacement parts. **BIG SAVINGS** in material, labor, postage.

# 10

## **STOCK SIZES**

for further details call our local distributor or write to

**JIFFY MANUFACTURING COMPANY**  
**HILLSIDE, NEW JERSEY**

Circle No. 224 on Card, Opposite Page 65

Here's Your Best Assurance of

Higher Output  
Better Accuracy  
Reduced Costs

On Every Boring  
and Facing  
Operation .....

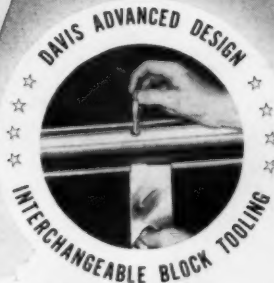


SOLID BLOCK  
CUTTER

MULTI-CUTTER BLOCK  
WITH EXPANDABLE  
CUTTERS

MICROMETER-ADJUSTABLE  
SINGLE-CUTTER  
BLOCK

TWO-CUTTER  
BLOCK WITH  
EXPANDABLE  
CUTTERS



With only two items to handle  
—block and taper lock  
screw—it takes but a few  
seconds to insert a Davis block  
in its bar and start boring.

**ONLY DAVIS  
GIVES YOU ALL**

**8 OF THESE ADVANTAGES**

1. Block centers accurately in bar.
2. Full thrust transmitted to bar.
3. Readily adjusts to float boring.
4. Cutters rigidly locked in block.
5. Assure maximum range of bore sizes.
6. Blocks feature built-in centers.
7. Fore or back bore with one tool.
8. Quick, easy changing of blocks.

FOR COMPLETE INFORMATION,  
WRITE FOR DAVIS CATALOG 304

*All 4 Block Styles Fit  
into the Same Bar Slot*

Every boring job in your shop goes faster, more accurately and shows up far better on cost records when you standardize on Davis block tooling.

Truer bores result from exclusive design features and simplified, precision construction. The unique Davis double-piloted, taper lock screw is unequalled for accurate centering of block and transmission of full boring thrust to the bar slot. Rigidly supported and locked cutters assure higher accuracy on even heaviest cuts.

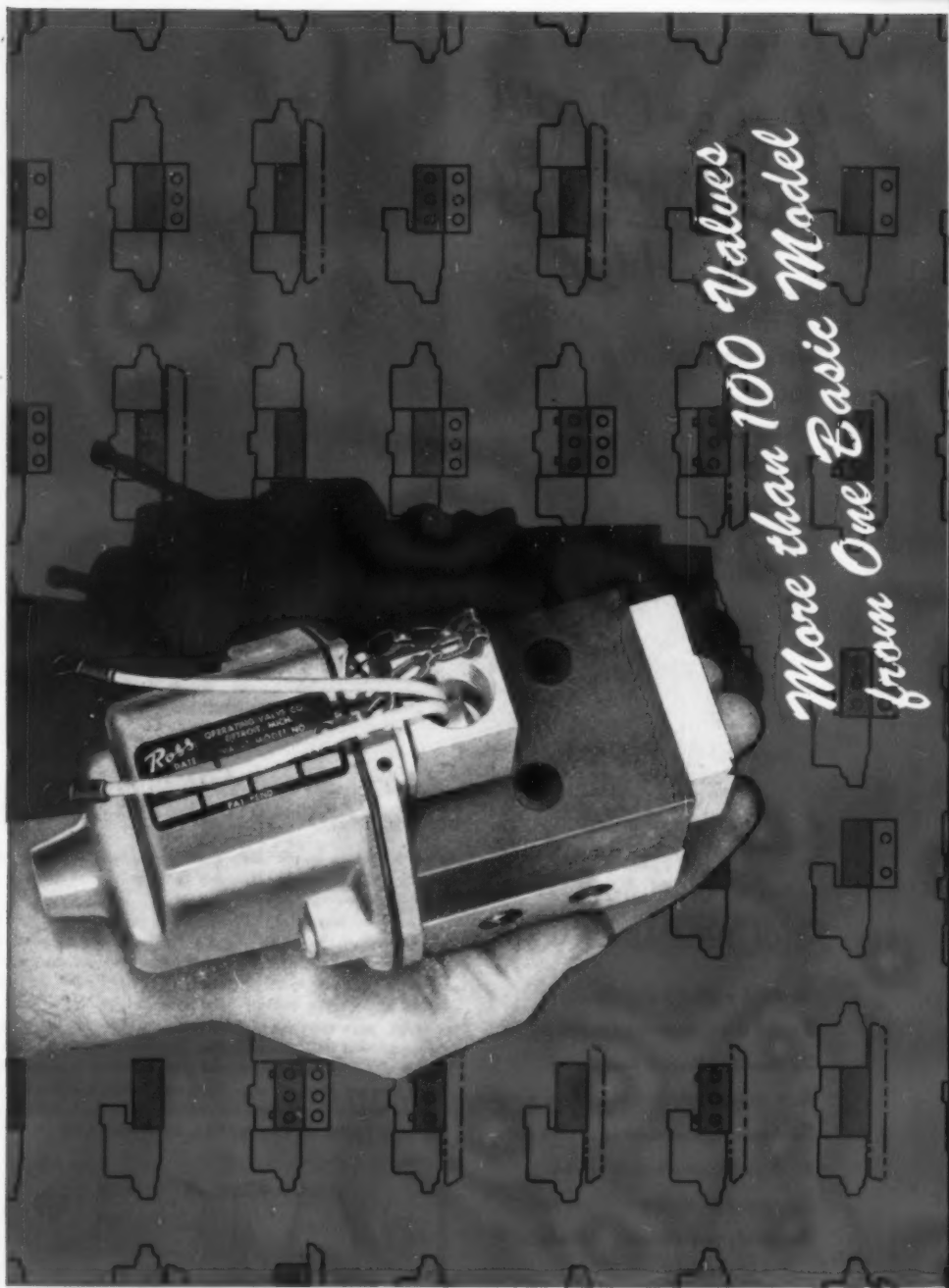
Faster, more economical boring results from the complete interchangeability of the Davis block line. Four basic block styles can be used in any particular bar slot—and changing blocks is simpler and faster than any other method. Bring your boring operations up to date—write now for complete information on how Davis Interchangeable Block Tooling can save you time, money and rejects.

**DAVIS**



BORING TOOL DIVISION OF  
Oiddings & Lewis Machine Tool Co.  
Fond du Lac, Wisconsin

THE ONE NAME THAT CERTIFIES ULTIMATE PRECISION AND PRODUCTIVITY IN TOOLING



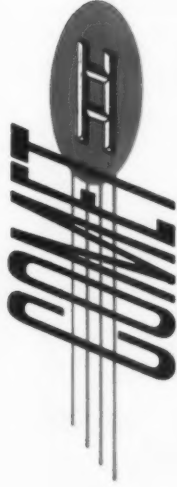
More than 100 Valves  
from One Basic Model

Ross

OPERATING VALVE CO.  
ESTABLISHED 1904  
MADE IN U.S.A.

FAT 1000

# Introducing the



## An Advanced Conception of Valving by Ross!

- Direct solenoid operated, balanced spool 4-Way—for air or oil service.
- Engineered and built to tolerances of .0001".
- Conforms to JIC standards.
- Complete valve cycle within 0.033 sec.
- Made of aluminum—single solenoid, base mounted weighs only 3½ lbs.
- Working surfaces almost as hard as a diamond.
- Small and compact—7¼" by 3½" by 3⅞".  
¼" diameter flow capacity.
- Available with ¼" or ⅜" pipe tap for inline, manifold or base mounted; single solenoid spring return, double solenoid momentary; double solenoid three position.



Write, wire or phone for complete information

**Ross** Tomorrow's EngineAIRing Delivered Today... Anywhere  
**ROSS OPERATING VALVE COMPANY**  
108 E. GOLDEN GATE AVENUE - DETROIT 3 - MICHIGAN



## **NOPAK Dual 4-Way is Main Air Control on "Modern" Cutting-Off Machine**

Modern Machine Tool Co., Jackson, Mich., uses the NOPAK Dual 4-Way valve as the "main air control valve" on its Cutting-Off Machine for these reasons:—

1. It provides the necessary sequence of operation control.
2. It is "easily mounted . . . in readily accessible position".
3. It directs air pressure either to part of the air system, or the whole system, as required.
4. With valve lever at 45°, "the operator can set the tools, with a gauge, against the stock while it (the stock) is locked in the collet".
5. In normal running position with valve lever at 90°, air is directed to other parts of system, while maintaining pressure on collet cylinder during cutting cycle.

This application may suggest how you can use NOPAK Valves and Cylinders for effective control and application of fluid power in your product, or in your plant equipment. For other suggestions see the NOPAK Application Manual.

**GALLAND-HENNING NOPAK DIVISION**  
2754 SOUTH 31ST STREET • MILWAUKEE 46, WISCONSIN

Representatives in  
Principal Cities

Write for Latest  
Shelf-Stock Listings

**NOPAK**  
® **VALVES AND CYLINDERS**  
**DESIGNED for AIR and HYDRAULIC SERVICE**

A 8574-1/2 I

Circle No. 227 on Card, Opposite Page 65

# New ALIGNING BUSHING

for Small Turret Lathes and  
Single Spindle Automatics



## Cures Mis-alignment Simply...but Accurately

That old bugaboo — machine mis-alignment — is a thing of the past. For now you can compensate for this "trouble maker" with the new J & L Aligning Bushing.

There's no guesswork involved — no approximations — no overhang. And it's *simple* to use.

The complete unit, consisting of a pair of eccentric bushings, both graduated in thousandths, can be set and put into use in a matter of minutes.

What's more, the unit sets flush with the face of the turret. It *adds no length* to your tools.

Write Dept. 710 today for free, illustrated instruction sheet.

# JONES & LAMSON

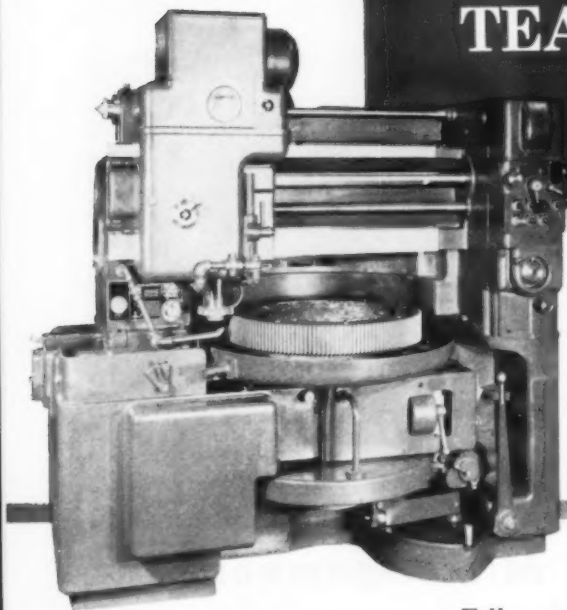
JONES & LAMSON MACHINE COMPANY, 520 Clinton St., Springfield, Vt., U.S.A.



Class III Guaranteed  
Not Sometimes, but Everytime!

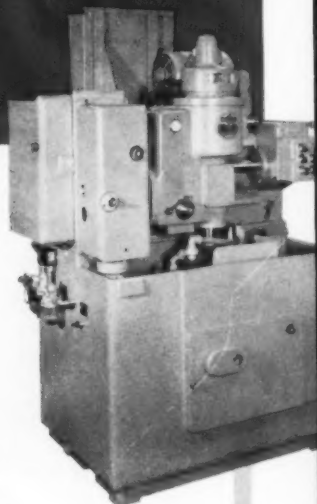
THREAD TOOL DIV.

# HIGH- PRODUCTION TEAM . . . . .



*Fellows  
36-Type  
Gear Shaper:*

produces gears up  
to 36" p.d., 6" face  
width.



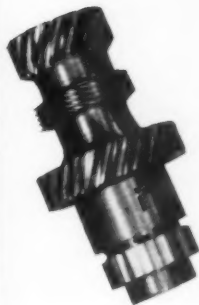
*Fellows  
No. 4 GS  
Gear Shaper:*

produces gears up  
to 6" p.d., 2" face  
width.



THE  
PRECISION  
LINE

. to meet your gear-cutting needs  
... up to 36" p.d.



With these two high-speed, close-tolerance machines you can cover the whole range of your spur and helical gear production requirements... offering maximum capacity at a reasonable investment.

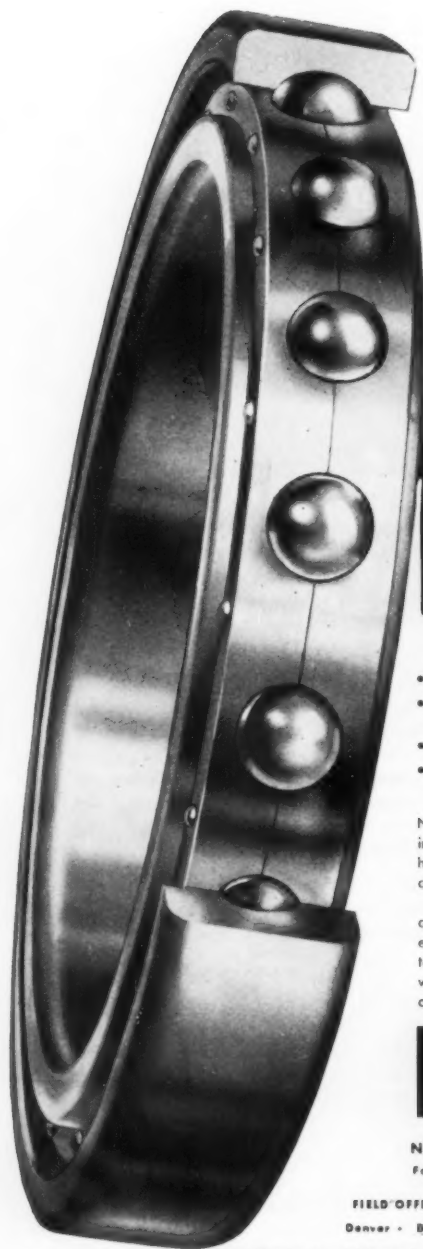
The new Fellows No. 4GS Gear Shaper finish-cuts internal and external spur and helical gears up to 6" p.d. and 2" face width, at 9 cutter speeds from 98 to 635 strokes per minute! It can be used for general purpose gear cutting or adapted to semi-automatic or completely automatic operation for large production runs. Rigid mechanism assures high speed with close tolerances. Rotary feeds from 0.008" to 0.028" based on 4" p.d. cutter

The Fellows 36-Type is a powerful machine that can hold close tolerances while taking extra heavy cuts on internal or external spur, helical, or herringbone gears up to 36" p.d. and 6" face width. Cutting speeds from 18 to 300 strokes per minute. Matched to modern needs for fast set-ups and quick, easy adjustments. Versatility permits wide-spread use cutting cams, splines, and special contours, too.

Get full information about this profitable team from your Fellows representative. And ask him about the Fellows Plan for deferred payment. WRITE, WIRE or PHONE any Fellows Office.

- THE FELLOWS GEAR SHAPER COMPANY,  
78 River Street, Springfield, Vermont.  
Branch Offices: 319 Fisher Building, Detroit 2  
5835 West North Avenue, Chicago 39  
2206 Empire State Building, New York 1  
6214 West Manchester Avenue, Los Angeles 45

***Fellows*** Gear Production Equipment



## Solve Bearing Space Limitation Problems

WITH

# **NORMA-HOFFMANN**

EXTRA LIGHT

## **XLS Series Precision Bearings**

### *Advantages*

- Have unusually large bores compared to outside diameter
- Provide utmost in accuracy, rigidity, and load capacity — (radial and thrust)
- Are compact, light in weight
- Allow greater freedom in design. In many cases these bearings provide the only solution where space is at a premium.

Norma-Hoffmann "XLS" Extra Light Inch Series Ball Bearings provide engineers and designers the advantage of high anti-friction performance plus space saving. They are ideal for hollow shafts.

These bearings are self-contained, non-separable and are suitable for combined radial and thrust loads in either direction. They are available in sizes from 1 3/4" to 22 1/2" bore. Our Field Engineers will gladly help you with your bearing problems. Write for their assistance and catalog.

## **NORMA-HOFFMANN** *Precision* **BEARINGS**

**BALL • ROLLER • THRUST**

**NORMA-HOFFMANN BEARINGS CORPORATION**

Founded in 1911

STAMFORD, CONNECTICUT

FIELD OFFICES: Atlanta • Chicago • Cincinnati • Cleveland • Dallas •  
Denver • Detroit • Kansas City • Los Angeles • San Francisco • Seattle

Circle No. 230 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



# RACINE

## LOW COST...LARGE CAPACITY

### Operating Features

- 1 **HYDRAULIC FEED AND CONTROL SYSTEM**—Pressures are controlled by a single graduated dial. Rate of feed is controlled by a small throttling valve.
- 2 **SWIVEL VISE** — Quick-acting self-positioning type for cutting any angles up to 45°.
- 3 **BEARINGS**—Extra large bronze bushings accurately press fitted are used on all rotary shafts.
- 4 **AUTOMATIC KNOCK-OUT**—Saw frame automatically rises to its highest point and motor is stopped at the completion of each cut.

### MODEL 816 UTILITY SAW

A fully automatic hydraulically operated all-purpose saw that will handle the full range of general cut-off work.

Any metal from tough tool steel to mild bars, tubing and structural shapes up to 8" x 16" can be cut with speed and precision.

No clutch, trains of gears, levers or ratchet devices are used. The Racine Model 816 is designed with a minimum of easily accessible precision-made working parts that assure years of dependable operation.

Write for catalog giving specifications on RACINE'S complete metal cutting saw line.



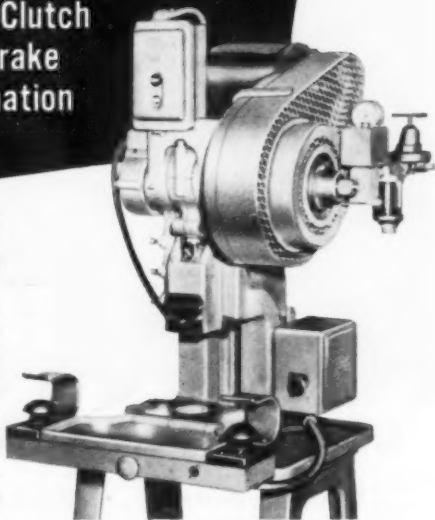
**RACINE HYDRAULICS & MACHINERY, INC.**

2054 Albert St., Racine, Wisconsin

Circle No. 231 on Card, Opposite Page 65

*Announcing...*  
*the new*  
**JUNIOR PRESS**

with Air Clutch  
and Brake  
Combination



**SAFETY TRIPPING DEVICE**  
**2 hands must hit controls**

This Perkins Junior "SK4" frame press is equipped with a combination air clutch and brake. The press capacity is about five tons. It can be operated at speeds ranging from a standard 325 to as high as 600 rpm. and single trip in one revolution. It is equipped with controls for single tripping with dual push buttons requiring the use of two hands, also for continuous running with top stop and jog. The top stopping position can be varied by an adjustment so that the correct stopping position can be obtained for whatever speed the press is set to run. There are many advantages to the use of air clutches. There are no steel dogs to replace and the maintenance is eliminated. The shaft is coupled to the wheel when the press is turning over so there is no motion between the ram and the wheel. The result is longer life for dies and punches. Higher speeds are possible with no harm to the clutch.

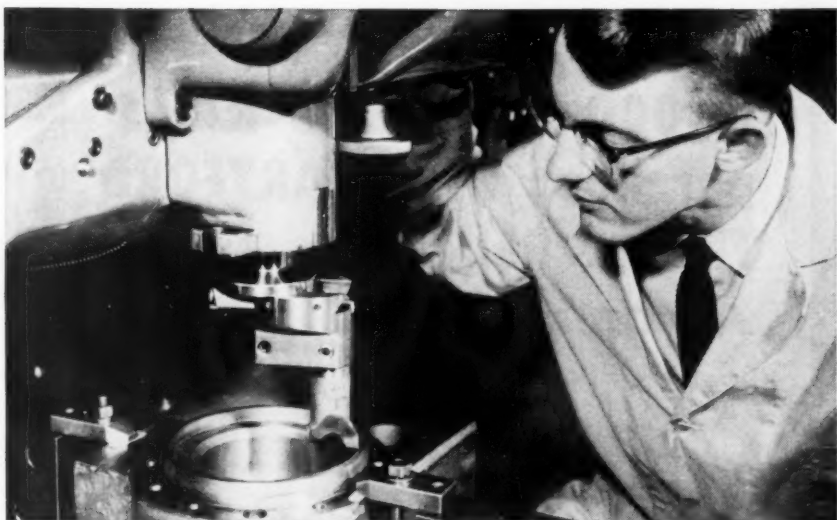
**FEATURES:** Rugged reinforced frame to prevent deflection.

Dual Push Button Control — safety for the operator.

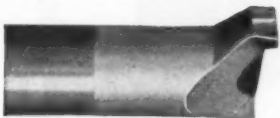
High Speeds — with no damage to clutch parts. Adjustable top stop position.

**PERKINS**  
**MACHINE CO. WARREN, MASS.**  
PRESS BUILDERS FOR OVER 50 YEARS

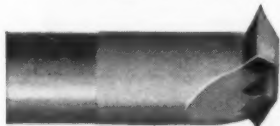
Circle No. 232 on Card, Opposite Page 65



**STYLE A**  
for general boring



**STYLE B**  
for bottoming and facing



**STYLE C**  
for internal threading



TRADE MARK REG U S PAT OFF

**BOKUM TOOL CO.**

**14775 Wildemere Ave.,  
Detroit 38, Mich.**

## PRECISION... *in BORING TOOLS*

You can bore smooth, straight, precision holes when you use Bokum standard tools. They're designed with accuracy in mind—all cutting and clearance angles have been figured to a mathematical formula so that they remain constant throughout the long life of the tool. You get a uniform and accurate bore in every piece.

Bokum tools are available in super high speed steel, carbide-tipped and solid tungsten carbide.

Resharpening is simple. Bokum tools are helically and radially backed off—must be sharpened on the top face only. Larger tools are made in two pieces with interchangeable cutting heads. Result: you eliminate special tools—cut costs when you standardize on Bokum.

*Write today for catalog covering standard boring tools.*

# 15,000 THREADED NAILS per hour with HARTFORD Thread Rollers... Automatically

## USER REPORT:

From Chas. F. Baker  
& Co., Framingham,  
Mass., John P. Hillberg,  
General Manager:  
"Hartford Special  
machines have been  
more than satisfactory  
on production and  
especially economical  
on up-keep."



## QUICK SPECS

Nail Diam. Capacity—.080" to .169"  
Thread Length Capacity— $\frac{1}{8}$ " to 2"  
Production Rate—250 pcs. per min.  
Floor Space Required 4' x 5'  
Machine Size—42" x 26" x 52"

Nail down the answer to your  
nail and screw threading  
problem. Check the specs.

For detailed information write for  
Bulletin TR-102.

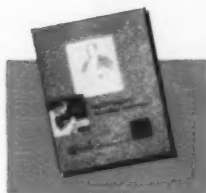
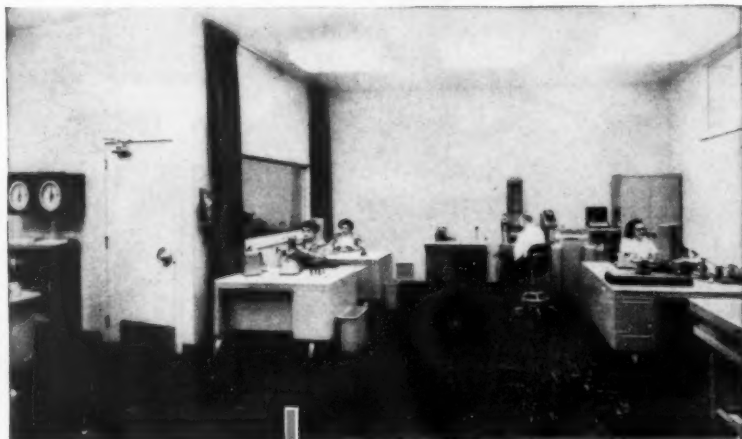
Machine Tool Accessories Division  
THE HARTFORD SPECIAL MACHINERY CO.  
2646 Homestead Ave., Hartford, Conn.

**HARTFORD**  
*Special*

Circle No. 234 on Card, Opposite Page 63

# THE ELI WHITNEY METROLOGY LABORATORY

**Your NEW Auditing Source  
For Dimensional Standards**



For a more comprehensive account of the facilities and capabilities of the Eli Whitney Metrology Laboratory, request Bulletin ML-1-56 from The Sheffield Corporation, Dayton 1, Ohio, U.S.A., Dept. 10.

American industry now has a new auditing source for dimensional standards at all precision levels.

In a maximum controlled environment—using instruments similar to those of the leading national standards laboratories of the world, the Eli Whitney Metrology Laboratory offers the following services:

## ① Calibrate and Certify:

- Dimensions of gage blocks, mechanical components and fixed size master gages including thread gages and threaded parts.
- Flatness and surface finish of optical true planes.
- Material hardness.
- Fineness of textile fibers.

- Circularity and graduations of precision circles—also circularity of manufactured components.

- Boundaries of contoured masters.

- ## ② Provide a counseling service
- for the development of industrial dimensional control and gage surveillance programs.



# SHEFFIELD

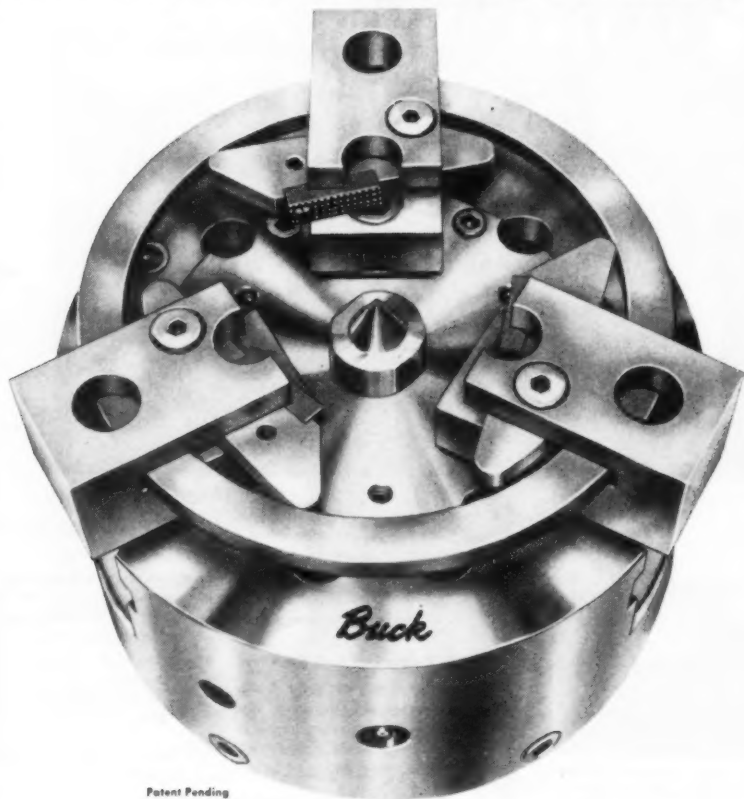
manufacture and measurement for mankind

Circle No. 235 on Card, Opposite Page 65

7522

# Another *Buck* FIRST!

## NEW COMPENSATING POWER CHUCK



Patent Pending

### Ends the Friction that Breaks Centers and Distorts Work

This Buck development begins a new era of greater efficiency in compensating chucks.

Gone is all the friction of internal compensating mechanisms that, in the past, have often forced undue pressure on work to distort it or break centers.

The Buck compensating mechanism is all outside of the chuck body. As jaws move in on work, one jaw pad always makes first contact. This instantly swings its rocker arm to the controlling ring, which in turn brings the other jaws up

to contact—with minimum pressure on the work.

The Buck operates equally well with the machine running or not—allows automatic loading and unloading. And its compensating mechanism increases gripping power to permit more rapid stock removal.

Since this is a Buck, the patented Buck Adjust-Tru principle can be used to position the center absolutely dead true. Work-holding diameters can be

changed, within practical limits, by replacing jaw pads.

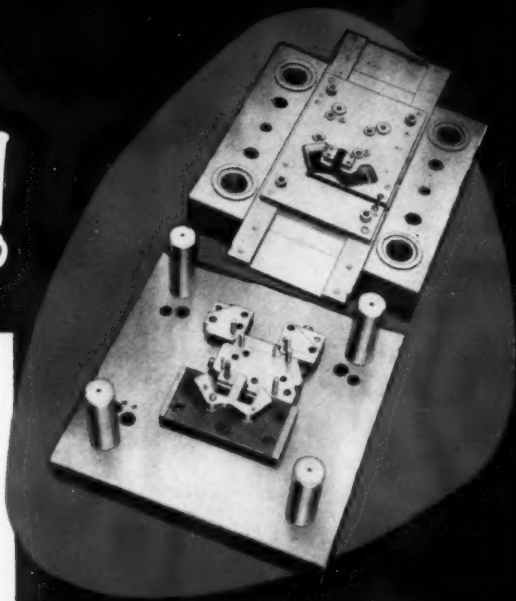
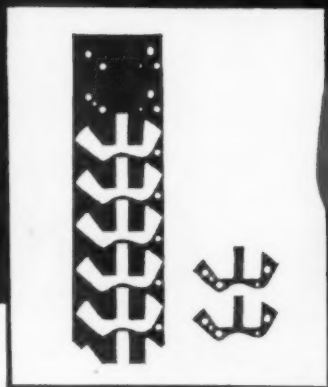
This is also a dual-use chuck. Compensating mechanism can be removed and the chuck used as any Buck Power chuck.

Sizes and prices: 6"—\$475; 8"—\$550; 10"—\$650; 12"—\$700. F.O.B. Kalamazoo. In ordering give the mean diameter of stock to be chucked so that proper size jaw pads can be supplied.

**BUCK TOOL COMPANY**  
612 SCHIPPERS LANE • KALAMAZOO, MICH.

Circle No. 236 on Card, Opposite Page 65

# Carbide Economy!



4700 MAGNETO LAMINATIONS PER HOUR!  
PRODUCED BY GALE PRODUCTS, DIVISION  
OF OUTBOARD, MARINE & MFG. CO., GALES-  
BURG, ILL., WITH A HARIG CARBIDE DIE.

Producing laminations for outboard motors and rotary power mowers, this Harig carbide die produces an average of  $2\frac{1}{2}$  to 3 million parts before reconditioning is necessary. Parts must be burr free to assure alignment of stack, and tolerances held from .002 to .006 maximum. Stamping material is Silicon core plated c-2 #26 ga. .0200—.0170 steel.

This is a typical example of Harig engineering and manufacturing skill. Pioneers in the use of carbides, Harig sets industry standards for precision and quality.

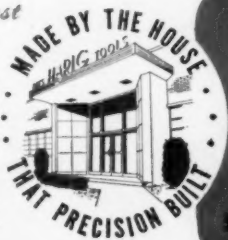
Let us estimate your next special tool or die job. There is no obligation.

*Headquarters for the Finest  
in Precision Tools!*

Harig engineering skill is at your disposal whenever you need special precision tools and dies. We will be



glad to send you this fully illustrated catalog showing our services and facilities.



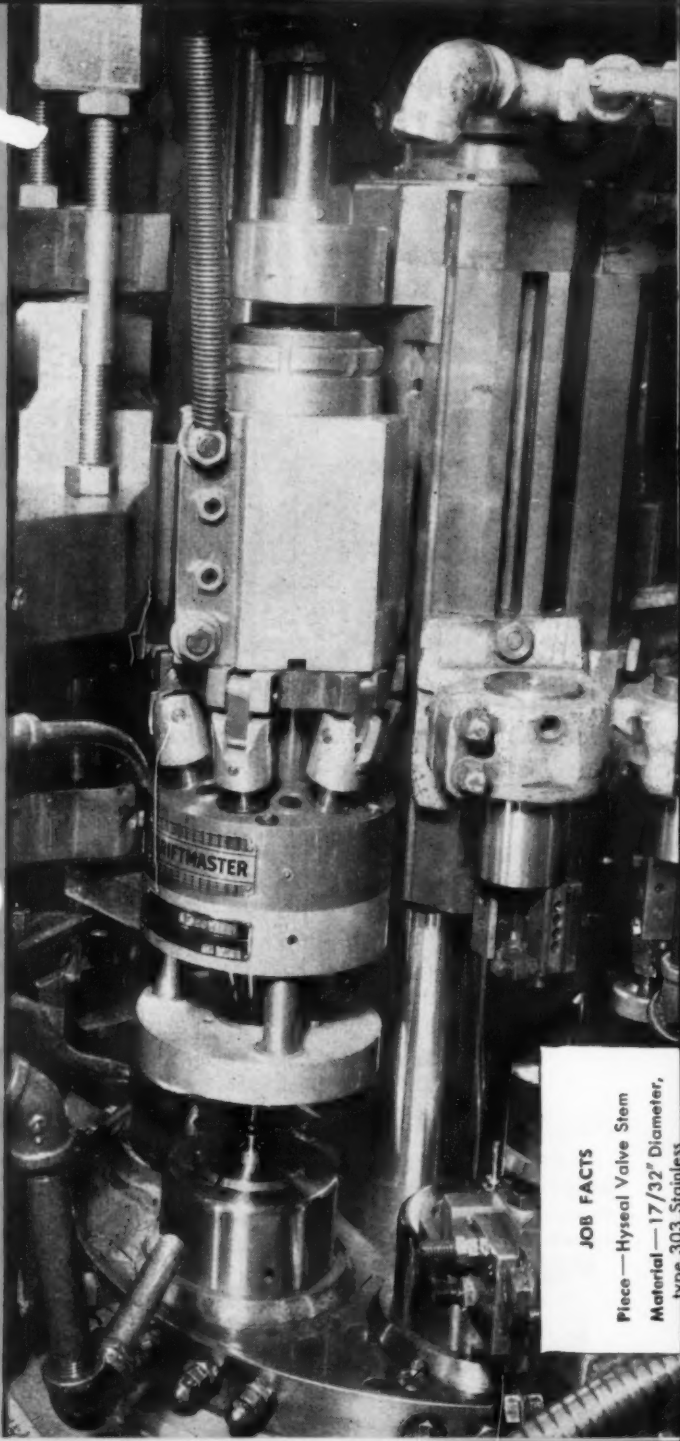
## Harig

*Manufacturing Corp.*

5763 W. Howard St., Chicago 31, Ill.

**with**

*Acme-Gridley*



**JOB FACTS**

**Piece—Hyseal Valve Stem**

**Material—17/32" Diameter,  
Type 303 Stainless**

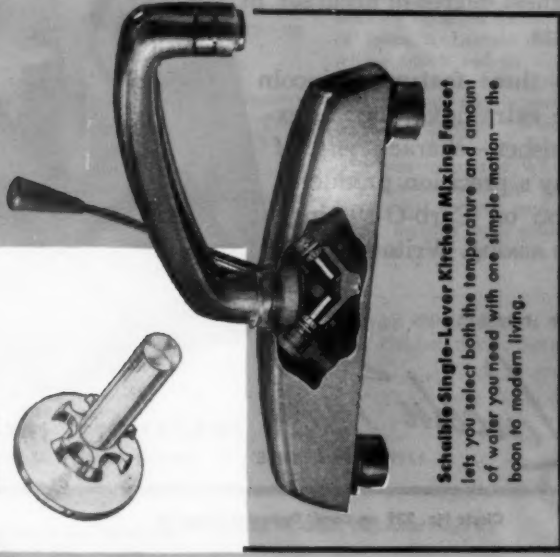
Operations—10, including

Operations—10, including multiple end milling of six half-holes at a 15° angle

Machine Time—12 seconds

Machine—1-1/4" RA-6

Acme-Gridley Bar Automatic



**Schauble Single-Lever Kitchen Mixing Faucet** lets you select both the temperature and amount of water you need with one simple motion—the boon to modern living.

## **you get CLOSER TOLERANCES with more operations in a single setup**

Following exhaustive study of other methods, the Schauble Company found that the only method of producing this valve stem to their rigid specifications at a reasonable cost was on a six-spindle Acme-Gridley bar automatic. Ten operations (including multiple end milling of six half-holes on a 15° angle) were performed in a single setup in 12 seconds machine time. Specifications required a 20 microinch finish to avoid wear on nonferrous components and working to limits of .002" t. i. r. between seating surface and end of valve stem.

**BULLETIN TP-44** shows tooling setups on 44 different bar jobs. Write today for your free copy and learn how both greater accuracy and reduced costs can be yours on an Acme-Gridley.

# National Acme

THE NATIONAL ACME COMPANY • 177 EAST 131ST STREET • CLEVELAND 8, OHIO

Circle No. 238 on Card, Opposite Page 45

# CARB-O-PLATING

*brings you CARBIDE WEAR LIFE  
at Substantially Lower Cost*

By the application of a thin wear-resistant coating of tungsten carbide—by means of the Linde Process—the life of gages, parts and tools is extended many times over.

Carb-O-Plating as employed by Lincoln Park offers you definite advantages. It provides the wear life of carbide at a cost considerably lower than when solid material is used. And because it is applied over a steel base, the products have resistance to mechanical shock and are not subject to breakage as can occur with sintered carbide. The process also makes possible the highest degree of accuracy in finished products.

In addition to these features, Lincoln Park offers the extra advantage of extremely fine finishes—characteristic of all the company's precision products. Full information on Carb-O-Plating is yours for the asking. Write today.



THE PLUS IN PRECISION

*Lincoln Park*

INDUSTRIES, INC.

1719 FERRIS AVENUE • LINCOLN PARK 25, MICHIGAN

**ENTER**  
**JONES & LAMSON'S**  
**NEW**  
**HORIZONS**  
**CONTEST**

**WIN a 2-weeks LUXURY  
VACATION  
FOR TWO!**

**Grand Prize:**

Two-Weeks Luxury Vacation Trip for Two, All Expenses Paid, to a choice of one of the following:

**PARIS**  
**THE CARIBBEAN**  
**CANADIAN ROCKIES**  
**HAWAII** Plus \$400 for spending money, baby sitter fee, etc.

**Two 2nd Prizes:** Each a Seven-Day All-Expenses-Paid Luxury Vacation for Two to Bermuda. Plus \$200 spending money.

**Three 3rd Prizes:** Each a Shopmaster Combination Saw - Jointer Power Tool, complete with motor.

**Ten 4th Prizes:** Each a Shopmaster Individual Single-Purpose Power Tool (A Choice of Saw, Drill Press, Jointer, etc.).

Contest is open to all persons, residing in the continental U. S. A., engaged in metal-working or allied industries, except employees of Jones & Lamson Machine Company, its selling agents and its advertising agency, and members of their families.

Contestants merely answer, in 150 words or less, the question "Which Jones & Lamson Machine, or Machine Feature, could, or does, help you most, and Why?"

When you write in (use coupon or not, as you wish), we will send you an official entry form, together with information upon which to base your answer.

**JONES & LAMSON**

JONES & LAMSON MACHINE CO.,  
520 Clinton St., Dept. 710  
Springfield, Vt., U.S.A.



**Jones & Lamson Machine Co.**  
520 Clinton Street, Springfield, Vermont

Please send official NEW HORIZONS  
CONTEST entry form and information to:

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Circle No. 240 on Card, Opposite Page 65

# SENSITIVE FOR SMALL HOLE DRILLING, RIGID FOR FULL CAPACITY JOBS

**"BUFFALO"** No. 15 drills give you all the features you need for peak production at the lowest possible cost. This includes:

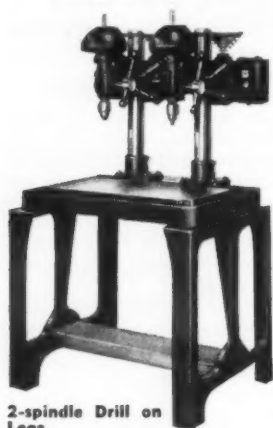
**EASE OF HANDLING:** (1) Handy 3-spoke feed and free-sliding spindle; (2) five quick-change speeds; (3) easy vertical adjustments of drillhead or table.

**STRENGTH:** overall rigid, heavy-duty construction including 2-3/4" steel column.

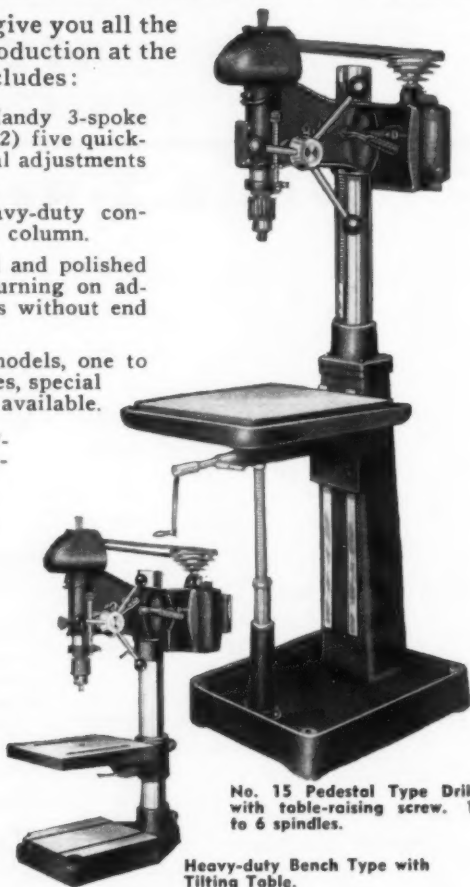
**ACCURACY:** accurately ground and polished 6-spindle alloy steel spindle turning on adjustable precision ball bearings without end play.

**COMPLETE SELECTION:** 15 models, one to six spindles, bench or floor types, special arrangements and attachments available.

**WRITE FOR BULLETIN 2963-G** for all "Q" Factor\* construction details.



2-spindle Drill on Legs.



No. 15 Pedestal Type Drill with table-raising screw. 1 to 6 spindles.

Heavy-duty Bench Type with Tilting Table.

\* The "Q" Factor—the built-in Quality which provides trouble-free satisfaction and long life.



## BUFFALO FORGE COMPANY

161 Mortimer St.

Buffalo, N.Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

**DRILLING • PUNCHING • SHEARING • BENDING**

Circle No. 241 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

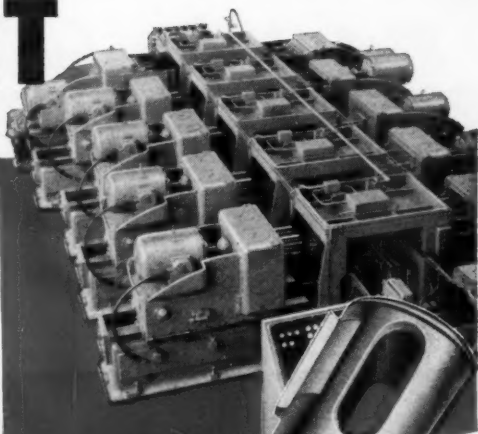
# SEIBERT

## ADAPTERS

well within  
tolerance  
standards

*say*

**GREENLEE  
ENGINEERS**



• More than 5 years ago, tool engineers at Greenlee Bros. & Co., Rockford, Illinois, conducted extensive tests on Seibert Shur-Lock Adjustable Adapters to determine if tolerances were held within their standards. As a result, Greenlee Automatic Transfer Machines, equipped with Seibert tools, are to be found in operation today in many of the world's largest mass production plants. Quality, service and price are the three reasons hundreds of users, like Greenlee, are today specifying Seibert tools. There is an experienced Seibert representative in every key industrial area to work with you in solving your specific tool holding problems.

Total concentricity held to .002" (total indicator reading) 6" from end of Adapter. Manufactured to GMC, Ford, Chrysler, and ASA standards.



### FREE LITERATURE

New brochure illustrates and describes Seibert's complete line of Holding and Driving Tools. Write for your copy.



Shur-Lock  
Adapter  
Bodies



Shur-Lock  
Micro-Nuts



Shur-Lock  
Tension and  
Compression  
Tap Drivers



Spindle  
Extension  
Adapter  
Assemblies



**SEIBERT & SONS, INC.** CHENOA, ILLINOIS  
*Quality* MULTIPLE DRILL SPINDLES AND PRODUCTION TOOLS

Circle No. 242 on Card, Opposite Page 65

*What do these have in common?*



Major components for all of these are pierced in low to medium production quantities at savings of from 60 to 90%—on WIEDEMANN Turret Punch Presses.

Write for a copy of Bulletin 101—or better yet, send drawings of your work for time studies by Wiedemann.

## WIEDEMANN MACHINE COMPANY

4265 Wissahickon Ave. P.O. Box 6794 Philadelphia 32, Pa.

Circle No. 243 on Card, Opposite Page 65

# Tough grinding jobs?

Check **Vulcanaire**  
high speed precision  
grinding heads!

Many seemingly impossible grinding problems have been solved by adapting Vulcanaire to standard machines or by using one of Vulcan's specially designed machines.

On Surface Grinders, merely remove wheel and guard, clamp vertical or horizontal adaptor to machine as illustrated. No belts necessary. For instance, Vulcanaire used in connection with Vulcan's Rotary Table for Surface Grinders permits the grinding of a circular slot.

Adaptors are in stock to fit the spindle of Vertical Milling Machines for grinding contours, holes and slots.

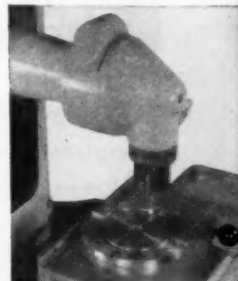
On Internal Grinding Machines Vulcanaire's infinitely controlled speeds furnish the correct surface cutting speed resulting in faster production and micro finish. The adaptor sleeve fits into present housing.

Applied to Jig Boring Machines, Vulcanaire is liked by leading precision manufacturers because its accuracy is guaranteed, producing Vulcanaire jig grinding of large and small parts.

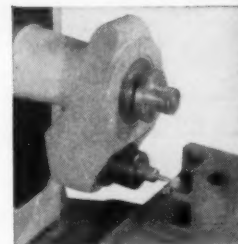
*Send us a blue print on your toughest grinding problem. Recommendations and sketches will be returned to you — no obligation.*



Grinding circular slot using Vulcan's Rotary Table and Magnetic chuck.



Vertical adaptor for Surface Grinders. Grinding small slots



Horizontal application Grinding a Shoulder Punch.

## Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

**VULCAN TOOL CO. 710 Highland Avenue DAYTON 10, OHIO**

**Production  
UP  
at NORTHROP**



**KNU-VISE clamps help cut drilling time**

Wherever fast, positive material holding is required—Knu-Vise toggle-action clamps are helping manufacturers do a better job.

**Model HS-400**



One application is shown above. This time Knu-Vise clamps are in use on a special fixture developed by Northrop Aircraft engineers for simultaneous drilling of seven rocket pod orifice holes for the Northrop F-89 Scorpion. Drilling time has been reduced from 10 hours to 45 minutes—including set-up time.

**REMEMBER**—if you have a holding problem—Lapeer Mfg. Co. offers a wide range of hand, air and oil operated clamps to increase efficiency and lower costs. Our catalog contains complete information. Write for your copy today.

Manufacturers of over 150 models of manually and air-operated clamps and pliers

**KNU-VISE  
PRODUCTS**

**LAPEER MANUFACTURING CO.**

**3052 DAVISON ROAD**

**LAPEER, MICHIGAN**

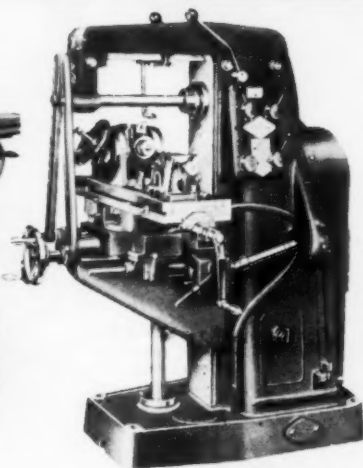
WESTERN DIVISION: 422 Magnolia, Glendale, California • CANADIAN DIVISION: Higginson Engr., Hamilton, Ontario

Circle No. 245 on Card, Opposite Page 65

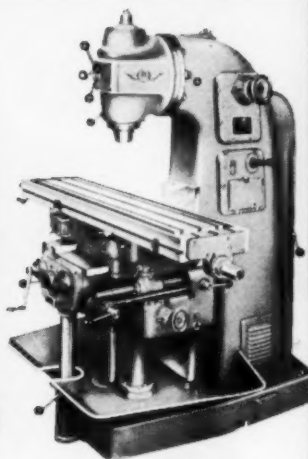
MACHINE and TOOL BLUE BOOK

# OUTSTANDING VALUES!

## PEDERSEN HORIZONTAL, VERTICAL AND COMBINATION MILLING MACHINES



**VPU-0**



**VPV-2**

### PEDERSEN UNIVERSAL TOOL & CUTTER GRINDER, MODEL U.S.I.

Main spindle rated at 3,800 to 5,750 RPM. Especially fine internal grinding spindle rated at 19,000 RPM maximum. (optional) Special table and saddle bearing arrangement insures smooth and easy table movement.

Many accessories available.  
36½" x 5½" table working surface:

SPECIFICATIONS	VPU-0	VPV-1	VPV-2
Table size	39½" x 9½"	51" x 12"	61" x 12"
Longitudinal travel	28½"	37"	42"
Cross travel	7½"	7¾"	9"
Vertical travel	15½"	15¾"	18"
Speed range, rpm	38-1,000	26-630	53-1,200
Net weight	2,200 lbs.	2,800 lbs.	3,850 lbs.
Prices, from	\$2,595	\$2,995	\$6,490

**\$2,595.00**

**LIBERAL TERMS**

**RENTAL PLANS**

## AARON MACHINERY CO., INC.

Dept. B • 45 Crosby Street, New York 12, N. Y., Walker 5-8300

Circle No. 346 on Card, Opposite Page 65



## Nichols Miller

### PRODUCTION MODEL

Precision turning, boring and re-cessing jobs that are normally assigned to toolmaker's lathes or expensive boring machines, come natural to the versatile NICHOLS Millers.

Rapid Lever Actions on the Spindle Head, Table, and Saddle provide unparalleled flexibility of movements. The Lever Transverse Feed, an exclusive NICHOLS development, is especially valuable. Makes NICHOLS different from other hand millers. It adds "lathe-carriage flexibility" to your most intricate machining operations, while maintaining tolerances to "tenths." Work can be chucked lathe-fashion on the spindle with tools mounted on the table or vice versa.

Adjustable positive stops, quick-acting locks on sliding movements, and the highest degree of precision are standard equipment.

"THE MILLER THAT USES ITS HEAD"



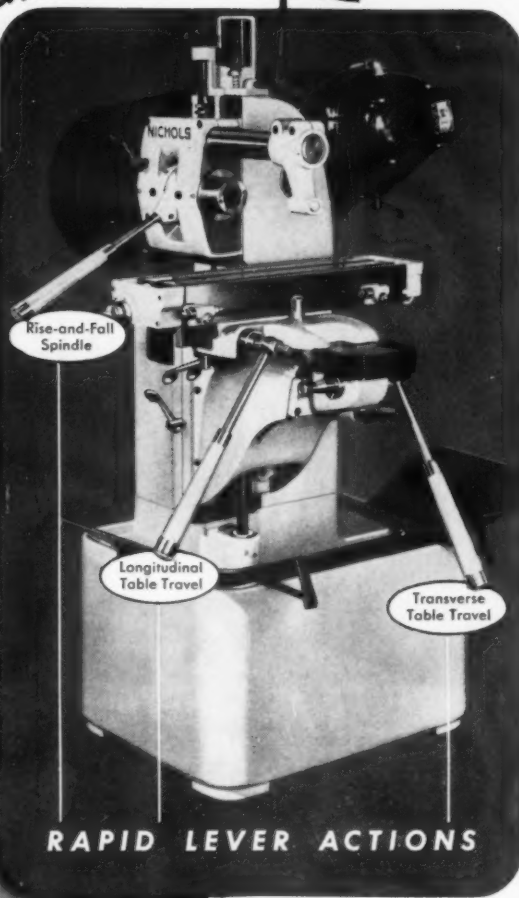
Send for free illustrated brochure.

MANUFACTURED BY W. H. NICHOLS COMPANY, WALTHAM, MASSACHUSETTS



NATIONAL DISTRIBUTORS  
**NICHOLS-MORRIS CORPORATION**

76-G MAMARONECK AVE., WHITE PLAINS, N. Y.



### RAPID LEVER ACTIONS

#### CONDENSED SPECIFICATIONS

Table Working Surface	6 1/2" x 21"
Longitudinal Table Travel	10"
Transverse Table Travel	7"
Vertical Travel of Knee	13"
Rise and Fall of Spindle	4 1/2"
Selective Speed Ranges up to	5000 R.P.M.
Weight	1250 lbs.

# KOPING

## HIGH SPEED LATHE

16½" SWING

# S 8 S

An outstanding example of Swedish precision craftsmanship. The S8S is only one of the great variety of Koping's lathes.

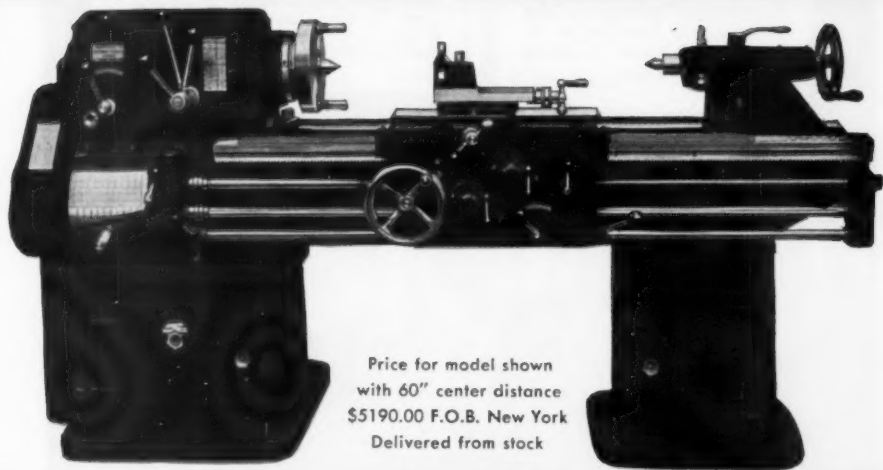
Write, outlining your needs, for complete details on the Koping lathe for your particular requirements.

### SPECIFICATIONS

Swing over bed	16½"
Spindle speeds, number	18
Spindle speeds in geometric progression	12.5-1000 r.p.m.
Thread pitches per inch threads, number	30
Threads per inch, range	2-68
Thread pitches for millimeter threads, number	26
Millimeter pitch, range	0.5-15 mm.
Motor	5 HP
Net weight w.o. motor	3950 lbs.

#### Extra equipment available

Cooling systems • Cutting speed selector • Load indicator • Special tool posts • Turrets • Relieving attachments • Taper turning and profiling attachments • Feed stops, etc.



Price for model shown  
with 60" center distance  
\$5190.00 F.O.B. New York  
Delivered from stock

KOPINGS MEKANISKA VERKSTADS A.B.  
SWEDEN

U.S. REPRESENTATIVE

*Homestrand*  
INCORPORATED

LARCHMONT, N.Y.

Note: Dealer inquiries invited. Several territories available.

# "Same Day" Shipment

from Ex-Cell-O's huge stock of precision

## Drill Jig Bushings

For your convenience, Ex-Cell-O maintains huge stocks of precision Drill Jig Bushings, and efficient expediting facilities which make possible "same day" shipment. This means orders are filled and dispatched from complete inventories in New York, Detroit, Los Angeles and London, Ontario, within a few hours after they are received!

Ex-Cell-O Drill Jig Bushings are made of oil-hardening bearing steel selected for its great wear resistance, and hardened in a new

atmosphere-controlled furnace. Material, hardness, dimensional tolerances and finish measure up to the highest standards of quality.

Call, wire or write Ex-Cell-O for the world's finest, fastest and most complete bushing service!

This complete Bushing Guide pictures and describes A.S.A. standard bushings, lists hundreds of Ex-Cell-O bushings available from stock. Write for as many copies as you need.



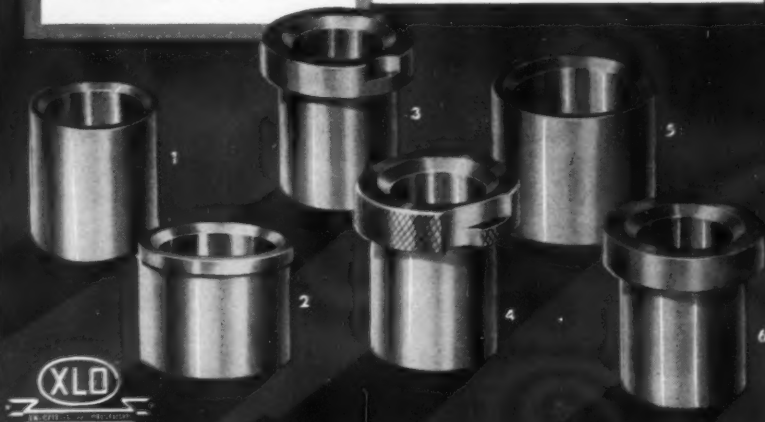
1. Headless Press Fit Bushings. 2. Head Liners. 3. Fixed Renewable Bushings. 4. Slip Renewable Bushings. 5. Headless Liners. 6. Head Press Fit Bushings.

### Ex-Cell-O Corporation

DETROIT 32, MICHIGAN

Manufacturers of Precision Machine Tools • Grinding Spindles • Cutting Tools • Railroad Pins and Bushings • Drill Jig Bushings • Aircraft and Miscellaneous Production Parts • Dairy Equipment

56-13



Circle No. 249 on Card, Opposite Page 65

for { —greater confidence in gaging results  
—continuous uniformity of production  
—lower gage costs per piece inspected

get

**BESLY  
METRO**

**GAGES**

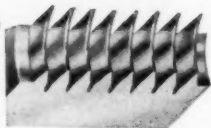
*Quality-Built to*

**STAY ACCURATE LONGER**

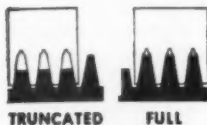
**Micro-Lapped  
Finish**

keeps gages accurate longer by reducing wear. No sharp "hills" and "valleys" to wear quickly and reduce gage accuracy.

**Extra Clearance**  
at root of ring gages permits wear correction.



**Truncated Thread Form**



TRUNCATED

FULL

of thread plug at no extra cost. Enables accurate setting and permits easy check for gage wear.

**Convolution of First Full Thread**

on thread plug and ring gages removes sharp scoring edges and prevents chipping. Also makes Besly-Metro Gages easier to use.



**BESLY**

**BESLY-WELLES CORP.**

Established as Charles H. Besly & Co. in 1875

122 Dearborn Avenue • South Beloit, Illinois



TAPS



DRILLS



REAMERS



GAGES



**CARBIDE  
TIPPED  
TOOLS**

Circle No. 250 on Card, Opposite Page 65

If you have a  
head for value



☆  
**STAR**  
MOLY  
HIGH SPEED  
☆



Order any of the full line of STAR Hand and Power Hacksaws, Metal and Wood Cutting Bandsaws and Hacksaw Frames from your Industrial Distributor.

Industry prefers STAR quality, prefers the blades made of carefully heat-treated, top-quality steel, fabricated on specially designed equipment — because STAR consistently delivers fast, economical metal cutting and long blade life.

Be sure to ask your Industrial Distributor for STAR "Moly"<sup>®</sup> High Speed Steel Blades. STAR developed this high speed, heavily-alloyed steel blade of molybdenum. Remember, "Moly" High Speed blades outlast standard steel blades 10 to 1, cut as well as the best high speed steel blades made, but are substantially lower in cost.

**FREE!** Ask your Industrial Distributor for a supply of our NEW Metal Cutting Booklets and Wall Charts



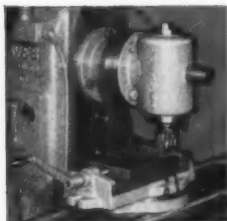
*Sold Only  
Through  
Recognized  
Distributors*

**CLEMSON**  
**CLEMSON BROS., INC.**  
MIDDLETOWN, N. Y., U. S. A.

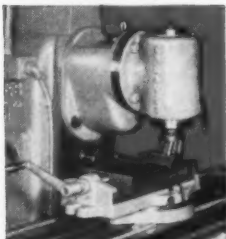
Ⓜ 1897

Makers of Hand and Power Hacksaw Blades, Frames, Metal and Wood Cutting Band Saw Blades and Clemson Lawn Mowers.

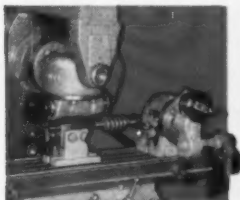
Circle No. 251 on Card, Opposite Page 65



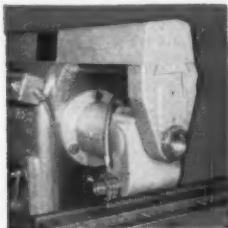
Heavy Duty Vertical  
Milling Attachment



Heavy Duty Offset  
Vertical Milling Attachment



Universal Milling Attachment



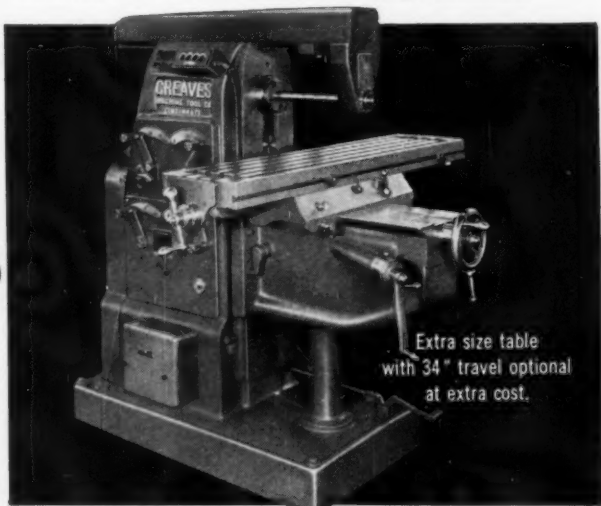
Rack Milling Attachment

**Heavy duty attachments  
increase versatility  
of dependable, low-cost**

# GREAVES MILLS

**"THE MOST MILL FOR THE LEAST MONEY"**

A full line of attachments and accessories offer outstanding flexibility for all types of milling operations . . . with GREAVES MILLS. Make your own comparison of 22 specifications of Greaves and 7 other leading milling machines.



Extra size table  
with 34" travel optional  
at extra cost.

## GREAVES MACHINE TOOL CO.

2600 Eastern Avenue, Cincinnati 2, Ohio

— Send Comparison Chart. I will make my own comparison of GREAVES MILLS with other makes.

— Send information on Attachments and Accessories for GREAVES MILLS.

NAME \_\_\_\_\_ TITLE \_\_\_\_\_  
FIRM \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Send coupon for  
FREE Comparison  
Chart and detailed  
descriptive literature  
on easy-to-use  
attachments.

Circle No. 252 on Card, Opposite Page 65

## District Managers MACHINE and TOOL BLUE BOOK

### EASTERN DIVISION

Dan E. Reardon, V.P.  
c/o Hitchcock Publishing Co.  
35 West 42nd Street  
New York 36, N.Y.  
Telephone: LAKAWANNA 4-4528

### NEW ENGLAND, EASTERN N.Y. STATE

Dan E. Reardon, V.P.  
Box No. 1, South Glastonbury, Conn.  
Telephone: MEDFORD 3-7083  
John Pickering Jr.  
592 Osgood St., North Andover, Mass.  
Telephone: LAWRENCE 8-0913

### NEW YORK, METROPOLITAN AREA

Martin J. Gailay  
Raymond J. Sietsema  
c/o Hitchcock Publishing Co.  
35 West 42nd Street  
New York 36, N.Y.  
Telephone: LAKAWANNA 4-4528

### EASTERN PENNA., CENTRAL N.Y. STATE,

N.J., MD., DELA., D of C., BROOKLYN, N.Y.  
Raymond J. Sietsema  
c/o Hitchcock Publishing Co.  
35 West 42nd Street  
New York 36, N.Y.  
Telephone: LAKAWANNA 4-4528  
Home telephone: CENTER 9-4364

### CENTRAL DIVISION

Henry J. Smith, V.P.  
c/o Hitchcock Publishing Co.  
222 East Willow Avenue  
Wheaton, Illinois  
Telephone: WHEATON 8-3400

### INDIANA, WESTERN OHIO, KENTUCKY

Henry J. Smith, V.P.  
c/o Hitchcock Publishing Co.  
222 East Willow Avenue  
Wheaton, Illinois  
Telephone: WHEATON 8-3400

### MICHIGAN, NORTHERN INDIANA, TOLEDO, OHIO

James C. Stewart, V.P.  
18055 James Couzens Highway  
Detroit 35, Michigan  
Phone: DIAMOND 1-9525

### ILLINOIS, WISCONSIN, IOWA, MINNESOTA, MISSOURI

Robert G. Bolinder  
Marvin Matson  
c/o Hitchcock Publishing Co.  
222 East Willow Avenue  
Wheaton, Illinois  
Telephone: WHEATON 8-3400

### WESTERN NEW YORK STATE, WESTERN PENNA., EASTERN OHIO

Ralph E. Helfrick  
1507 Edgefield Road  
Cleveland 24, Ohio  
Telephone: HILLcrest 2-8189

### WESTERN DIVISION

#### CALIFORNIA, ARIZONA

Keith H. Evans  
3723 Wishire Boulevard  
Los Angeles 5, California  
Telephone: DUNKirk 8-2961  
593 Market St., Room 304  
San Francisco 5, Calif.  
Telephone: YUKon 2-4286

#### OREGON, WASHINGTON

Lloyd Thorne  
531 Medical Arts Building  
Seattle 1, Wash.  
Telephone: Main 6827

**HITCHCOCK PUBLISHING CO. • Telephone WH 8-3400 • Wheaton, Ill.**



## LARGEST variety of . . .

standard circular FORM TOOLS and BLANKS.

Over 600 sizes carried in stock for  
IMMEDIATE DELIVERY.

It's no longer necessary or economical to "hand grind" tools or purchase "made to order" tools for short run jobs. Let SOMMA STANDARD CIRCULAR

FORM TOOLS give you uniform, correct dimensions, better finish and appearance, less set-up trouble. In short—maximum production at the lowest cost.

Send for new catalog now listing DAVENPORT STANDARD TOOLS and BLANKS as well as many new sizes of BROWN & SHARPE STANDARD TOOLS and BLANKS.

West Coast Warehouse: 576 No. Prairie, Hawthorne, California

## SOMMA TOOL COMPANY Inc.

Manufacturers of Standard and Special Precision Form Tools

21 BROWN STREET • WATERBURY, CONN.

FIRST CLASS  
PERMIT NO. 272

WHEATON, ILLINOIS

**BUSINESS REPLY CARD**

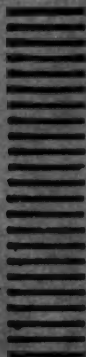
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

**MACHINE and TOOL BLUE BOOK**

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



FIRST CLASS  
PERMIT NO. 272

WHEATON, ILLINOIS

**BUSINESS REPLY CARD**

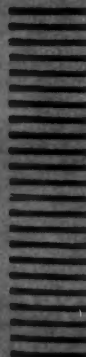
NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

**MACHINE and TOOL BLUE BOOK**

READERS' SERVICE DIVISION

WHEATON, ILLINOIS



June, 1956

For free information . . . use these postage-free Action Cards

Advertisements

																circle key numbers			
201	226	251	276	301	326	351	376	401	426	451	476	501	526	551	576				
202	227	252	277	302	327	352	377	402	427	452	477	502	527	552	577				
203	228	253	278	303	328	353	378	403	428	453	478	503	528	553	578				
204	229	254	279	304	329	354	379	404	429	454	479	504	529	554	579				
205	230	255	280	305	330	355	380	405	430	455	480	505	530	555	580				
206	231	256	281	306	331	356	381	406	431	456	481	506	531	556	581				
207	232	257	282	307	332	357	382	407	432	457	482	507	532	557	582				
208	233	258	283	308	333	358	383	408	433	458	483	508	533	558	583				
209	234	259	284	309	334	359	384	409	434	459	484	509	534	559	584				
210	235	260	285	310	335	360	385	410	435	460	485	510	535	560	585				
211	236	261	286	311	336	361	386	411	436	461	486	511	536	561	586				
212	237	262	287	312	337	362	387	412	437	462	487	512	537	562	587				
213	238	263	288	313	338	363	388	413	438	463	488	513	538	563	588				
214	239	264	289	314	339	364	389	414	439	464	489	514	539	564	589				
215	240	265	290	315	340	365	390	415	440	465	490	515	540	565	590				
216	241	266	291	316	341	366	391	416	441	466	491	516	541	566	591				
217	242	267	292	317	342	367	392	417	442	467	492	517	542	567	592				
218	243	268	293	318	343	368	393	418	443	468	493	518	543	568	593				
219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594				
220	245	270	295	320	345	370	395	420	445	470	495	520	545	570	595				
221	246	271	296	321	346	371	396	421	446	471	496	521	546	571	596				
222	247	272	297	322	347	372	397	422	447	472	497	522	547	572	597				
223	248	273	298	323	348	373	398	423	448	473	498	523	548	573	598				
224	249	274	299	324	349	374	399	424	449	474	499	524	549	574	599				
225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600				

Inserts: Inside Front Cover 1A 1B 1C 1D Inside Back Cover 2A 2B 2C 2D Back Cover 3A 3B 3C 3D

Company .....

Name..... Position.....

Street .....

City..... Zone..... State.....

June, 1956

For free information . . . use these postage-free Action Cards

Free Literature

circle key numbers

1	11	21	31	41	51	61	71
2	12	22	32	42	52	62	72
3	13	23	33	43	53	63	73
4	14	24	34	44	54	64	74
5	15	25	35	45	55	65	75
6	16	26	36	46	56	66	76
7	17	27	37	47	57	67	77
8	18	28	38	48	58	68	78
9	19	29	39	49	59	69	79
10	20	30	40	50	60	70	80

New Products

circle key numbers

81	91	101	111	121	131	141	151	161	171
82	92	102	112	122	132	142	152	162	172
83	93	103	113	123	133	143	153	163	173
84	94	104	114	124	134	144	154	164	174
85	95	105	115	125	135	145	155	165	175
86	96	106	116	126	136	146	156	166	176
87	97	107	117	127	137	147	157	167	177
88	98	108	118	128	138	148	158	168	178
89	99	109	119	129	139	149	159	169	179
90	100	110	120	130	140	150	160	170	180

Company.....

Name..... Position.....

Street.....

City..... Zone..... State.....



# GREEN

**Model D-2**

**Pantograph Engraver**

Unique design of the two dimensional Model D-2 features — Single micrometer adjustment controls vertical depth of cut, and adjusts height of copy table and pantograph.

Range of ratios from 2 to 1 to infinity!

Accessibility on three sides permitting panels up to 30" diameter to be engraved, milled or profiled. Vertical range over 10" allowing operations on complete chassis, cabinets or other bulky objects. Ruggedness, stability and precise accuracy, inherent in construction.

Mounted on the Green Engraver Bench, ruggedly constructed of heavy duty steel, this D-2 compact unit provides a highly efficient pantograph engraver assembly. All functional parts are conveniently within reach of the operator while seated. Accessibility of master type sets stored in lower cabinet trays, tools and accessories contribute to productive capacity.

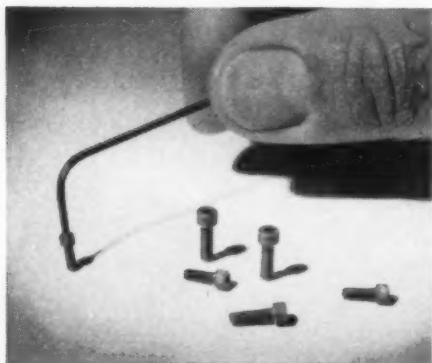
A brochure with full details is yours upon request.

*Literature also available on the smaller Model 106 three dimensional engraver.*

**GREEN INSTRUMENT COMPANY**

**386 Putnam Ave., Cambridge, Mass.**

## Miniature screws aid standardization of small devices



Standard UNBRAKO miniature socket head cap screws are available in sizes # 0, # 1, # 2 and # 3, in heat treated alloy steel or stainless steel, at your authorized industrial distributor's. Standard lengths range from  $\frac{1}{8}$  to  $\frac{1}{2}$  in.

### Tiny close-tolerance Unbrako screws available in standard sizes

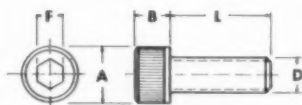
New economies in the design of space-saving small equipment are now possible with these UNBRAKO miniature socket head cap screws. Manufactured to time-piece precision, available locally, they save the costly necessity of designing special screws to fasten tiny parts in compact units. They're ideal for use in typewriters, calculators and computers, servomechanisms, electric and electronic equipment—and in countless other small intricate devices where maximum reduction in bulk and weight is required with no sacrifice in strength of individual components or assemblies.

Fingers grip the knurled heads on these tiny screws positively for easy handling and fast assembly. Uniform hex sockets assure maximum wrenching torque. Controlled fillets under the heads prevent shearing of the heads. Threads are fully formed for maximum strength and exact fit. Extremely accurate head diameters permit their use in countersunk holes, saving weight by reducing the length of the screw required and making flush designs possible.

These standard UNBRAKO miniature screws are available at your authorized industrial distributor's. See him today. Or write us for Bulletin 2055 and samples. STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

Standard screws are threaded to the head. Special materials, lengths, and threaded lengths are available. One "High-Titan" UNBRAKO hex key is included with each package of 100 screws.

#### HEAT-TREATED ALLOY STEEL Class 3 Fit Standard



	Diameter	Threads per Inch NC NF	Length	Recommended Installation Torque in Inch-Pounds		Weight per 1000 in Pounds
				NC	NF	
#0	A .104	80	$\frac{1}{8}$	2.0		.152
	B .060	80	$\frac{3}{16}$	2.0		.182
	D .060	80	$\frac{1}{4}$	2.0		.210
	F .050	80	$\frac{3}{8}$	2.0		.265
#1	A .118	72	$\frac{1}{8}$	3.5		.27
	B .073	72	$\frac{3}{16}$	3.5		.32
	D .073	72	$\frac{1}{4}$	3.5		.37
	F .050	72	$\frac{3}{8}$	3.5		.47
#2	A .140	56	$\frac{3}{16}$	6.0		.42
	B .086	56	$\frac{1}{4}$	6.0		.50
	D .086	56	$\frac{3}{8}$	6.0		.58
	F $\frac{1}{16}$	56	$\frac{1}{2}$	6.0		.70
#3	A .161	48	$\frac{3}{16}$	8.5		.59
	B .099	48	$\frac{1}{4}$	8.5		.70
	D .099	48	$\frac{3}{8}$	8.5		.81
	F $\frac{3}{16}$	48	$\frac{1}{2}$	8.5		1.03

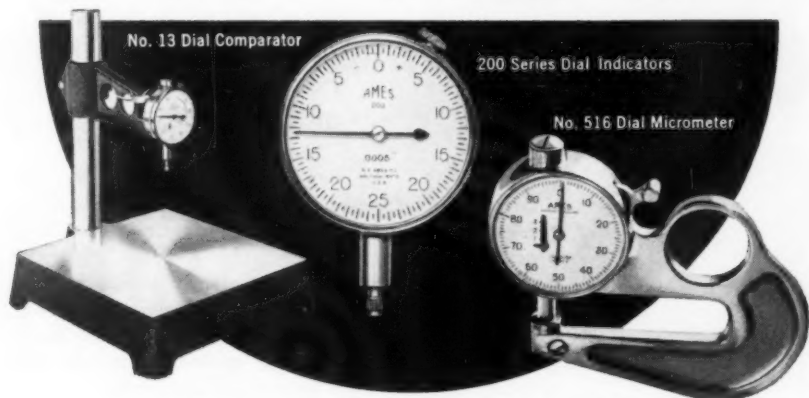
**UNBRAKO** SOCKET SCREW DIVISION

STANDARD PRESSED STEEL CO.

**SPS**  
JENKINTOWN PENNSYLVANIA

Circle No. 263 on Card, Opposite Page 65

# AMES



*... the preferred on every job*  
for time-saving accuracy and dependability

Today, as for the past half century, Ames instruments are solving industry's toughest measurement problems, while providing unquestioned accuracy through millions of cycles.

We will gladly make recommendations on your measurement problems. Please send prints and specifications. And ask for your free copy of the Ames catalog.

*Representatives in principal cities*



## B.C. AMES CO.

28 Ames Street, Waltham 54, Mass.

MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

Circle No. 264 on Card, Opposite Page 65

June, 1956

67

# **BARNESDRIL**

## **COOLANT FILTERS**



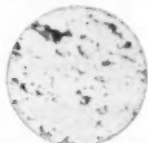
give you **2 Stage\***

### **COOLANT CLEANING**

*For Selective Degree  
of Coolant Clarity*

Barnesdril Engineers provide two distinct stages in coolant cleaning. The new Kleenall Unit \*combines practical magnetic separation for removal of ferrous particles, \*with positive cleaning by filtration to eliminate non-ferrous or other objectionable foreign matter. With control inherent in this method it is possible to give you the exact degree of coolant cleanliness that is practicable for your production operations.

#### **Complete Lab Facilities for Your Convenience**



Typical micro-photo of composite swarf from a high production cutting operation.

In their modern coolant laboratory, these engineers can precisely measure waste particles and classify them by physical types. Percentage of contamination is thus determined, and they are then able to select a filter medium and unit to give you the degree of coolant clarity desired.

Ask a Barnesdril representative today for an analysis of your coolant cleaning problems and recommendations for the most practical solution.

**Write for Catalog 350G**



**FILTRATION DIVISION  
BARNES DRILL CO.**  
852 CHESTNUT STREET • ROCKFORD, ILLINOIS

Circle No. 265 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

# Brand New!

*haskins*  
**haskAIR Grinder...**

**most powerful  
air turbine grinder  
in its class!**

**75,000**  
**R.P.M.**  
(1/5 H.P. prony brake test)



- Permanently sealed bearings . . . never needs lubrication in air lines or grinder.
- Removable nose piece for deep grinding.
- Gyro action of turbine holds tool steady.

Here's power—SUSTAINED POWER—like you've never experienced before in an air grinder . . . power unexceeded by any other air grinder in the same price range . . . maintains its high-speed efficiency under load! Built with a lightweight, contoured, hand-fitting aluminum housing, the Haskins **haskAIR** Grinder handles easily, balances perfectly . . . excellent for the most precise grinding job. Complete kit includes: carrying case, adapter hose, mounted points, dressing stone and wrenches.

**for Complete details**



2645 W. Harrison St.  
Chicago 12, Illinois

Circle No. 266 on Card, Opposite Page 65



**TOOL MAKERS, Inc.**

turns

to

**pivot**

**HIGH-SPEED  
STEEL  
PUNCHES**

### HOW WOULD YOU SOLVE THIS PROBLEM ?

Pierce .050 thick annealed No. 30 stainless steel washers of .125 diameter with a .035 diameter hole. Screw-machining obtained an average of 5 holes per drill at a cost of approximately 45¢ per hole.

### HERE'S HOW TOOL MAKERS, Inc.,

of Culver City, California, solved the problem. These famous tool designers and builders incorporated Pivot Straightground Whipsleeved High Speed Steel Punches in a die with 10% clearance.

Mr. Earl Ellsworth, Vice-President, reports:

"We now average 500 to 1,000 parts, and have obtained as high as 3,000 parts per punch. Since going to Pivot Punches we are obtaining completely burr-free holes and the complete washer costs us less than 10% of previous methods."

See how Pivot Punches can increase the quality and quantity of your production at decreased costs. Send for complete catalog of straightground, whipsleeved or cylindrically ground punches and piercing accessories. Prices listed. Write Dep't. M.T.

(Ask for our new Free Booklet "55 Problems and Solutions")  
A helpful handbook for all Tool Engineers!



**pivot punch and die corp.**

**NORTH TONAWANDA, N. Y.**

Circle No. 267 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

## Why the Die Maker Prefers **PRODUCTO** Die Sets



Volkert Stampings, Inc.

### **The die maker likes to work with Producto Die Sets**

He knows Producto die sets are easy to assemble—especially those equipped with the unique new Qwik-Fit Guide Pins\*.

He has confidence in the consistent accuracy of Producto sets. He has found that they always align his dies correctly.

He knows he can choose from a variety of thicknesses the Producto die set that meets the strength requirements of his die.

He favors Producto die sets because they are dependable. They will perform on the press as well as they did in tryout.

He likes the attractive, streamlined appearance of Producto sets. They make his dies look better and increase his pride in these products of his craftsmanship.

\*Patent Pending



PRODUCTO

Wherever die sets are used

# PRODUCTO

PRODUCE MORE WITH PRODUCTO PRECISION DIE SETS

Circle No. 268 on Card, Opposite Page 65

He knows that a nearby Producto warehouse can supply any catalog die set he needs...and that orders for specials are promptly processed. He can count on having the die set by the time he needs it.

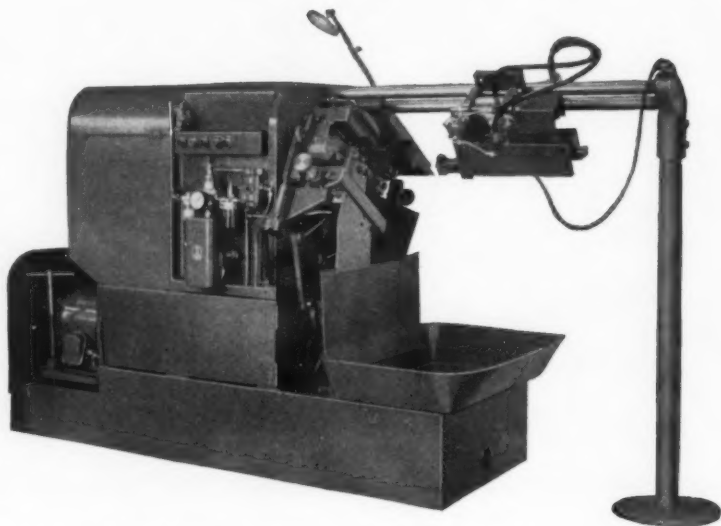
The die maker has found that all of his requirements are met by Producto die sets. You will, too, when you place your order with Producto.

**DIE SET DIGEST**, our eight-page quarterly, contains valuable data for designers, makers and users of dies. Write to have your name added to mailing list.



**THE PRODUCTO MACHINE COMPANY**  
900 Housatonic Ave., Bridgeport 1, Connecticut

## The MODERN AUTOMATIC CUTTING-OFF MACHINE



### **Cuts Off Tubing, Pipe and Shafting . . . FAST**

Cuts off longer pieces than a regular automatic machine. In fact, cuts off any length you want—and cuts faster. If your production requires quantity cutting-off of tubing, pipe or shafting, check the figures below against your present time.

#### **1/2" Tubing**

This machine cuts off and chamfers both outside edges of 1/2" .030 wall tubing, 5' long at the rate of one every 2.5 seconds.

#### **1 1/4" Cold Rolled**

This machine cuts off and chamfers both ends of 1 1/4" cold rolled, 20" long, at the rate of one every 20 seconds.

#### **1" Tubing**

This machine cuts off and chamfers both outside edges of 1" of 3" long, at the rate of one every 3 seconds.

These popular, time saving machines are now available in four sizes, handling work up to 6 3/4" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

WRITE FOR ILLUSTRATED CATALOG

**MODERN MACHINE TOOL COMPANY**  
Jackson, Michigan

Circle No. 269 on Card, Opposite Page 65

*Get better cutting and longer life  
from the standard and special cutters  
you use every day in production*



**RO**  
**UNIVERSAL**  
**FORM RELIEVING**  
**FIXTURE**

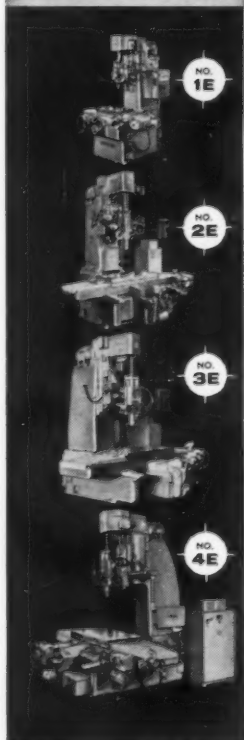
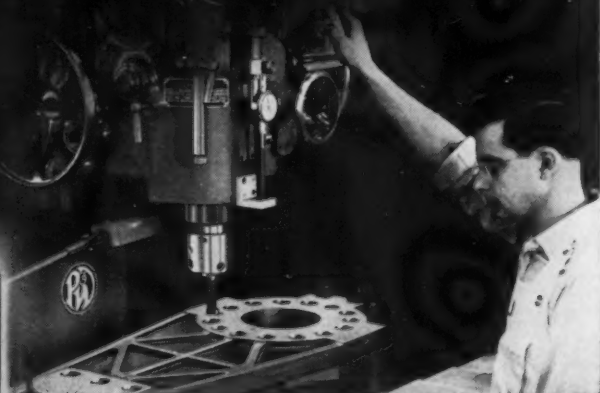
Produces radial or axial relief only or any combination of the two on taps, step drills, profile mills, reamers, etc. Operation has been completely simplified. For maximum versatility use with the R-O Grinder.

*Write for literature*

**GRINDER DIVISION**  
**ROYAL OAK TOOL & MACHINE CO.**  
29800 STEPHENSON HY.    ROYAL OAK, MICH.

Circle No. 270 on Card, Opposite Page 65

Get  
to the POINT... *in a hurry!*



with

## **PRATT & WHITNEY** **Electrolimit JIG BORERS**

The point we make is that Pratt & Whitney Electrolimit Jig Borers use an exclusive method of locating the table that's unbeatably fast, convenient . . . and accurate to .0001". Thanks to the P&W Precision Preloaded Ball Roll Quill, original accuracy and rigidity are maintained *indefinitely* without adjustment or maintenance . . . and there'll never be any loss of accuracy from wear.

- • • Now . . . Pratt & Whitney Electrolimit Jig Borers can also be furnished with positioning control by *Numerical Data*. COMPLETE LINE . . . includes table sizes from 12" x 24" to 36" x 72".

Write for your free copy of P&W Jig Borer Circular No. 587.

ALSO FURNISHED . . . a full line of Pratt & Whitney End Measure Jig Borers which also deliver "tenths" accuracy year after year.



**PRATT & WHITNEY COMPANY**  
INCORPORATED

22 Charter Oak Boulevard, West Hartford, Conn.  
Direct Factory Representatives In Principal Cities

MACHINE TOOLS • GAGES • CUTTING TOOLS

Circle No. 271 on Card, Opposite Page 65

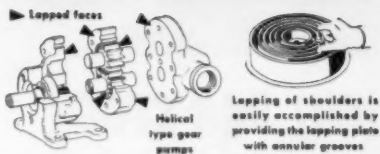
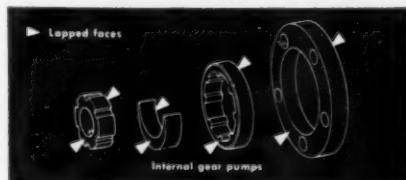
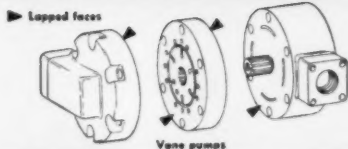
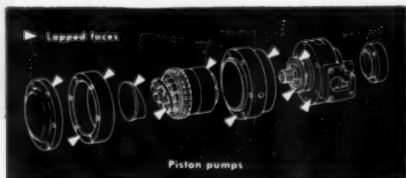
MACHINE and TOOL BLUE BOOK

## How Pump Manufacturers Use the

# Lapmaster® To Improve Product Performance

Like valve manufacturers, a large number of pump manufacturers need precision flatness and finish in order to insure efficient product performance. They're getting both flatness and finish plus parallelity in production quantities with Lapmasters. Photos at right illustrate a few typical parts being machined daily.

The high production accuracy of the Lapmaster (micro-inch finishes of 2 to 3 RMS—surface flatness to less than .000011" when required) is being achieved on all materials including cast iron, steel, stainless steel, magnesium, aluminum, brass, carbon, ceramics, plastics and sintered metals. It will pay you to investigate this modern precision, yet economical, method of machining.



\*Protected by U.S. and Foreign Patents

### FREE TECHNICAL DATA

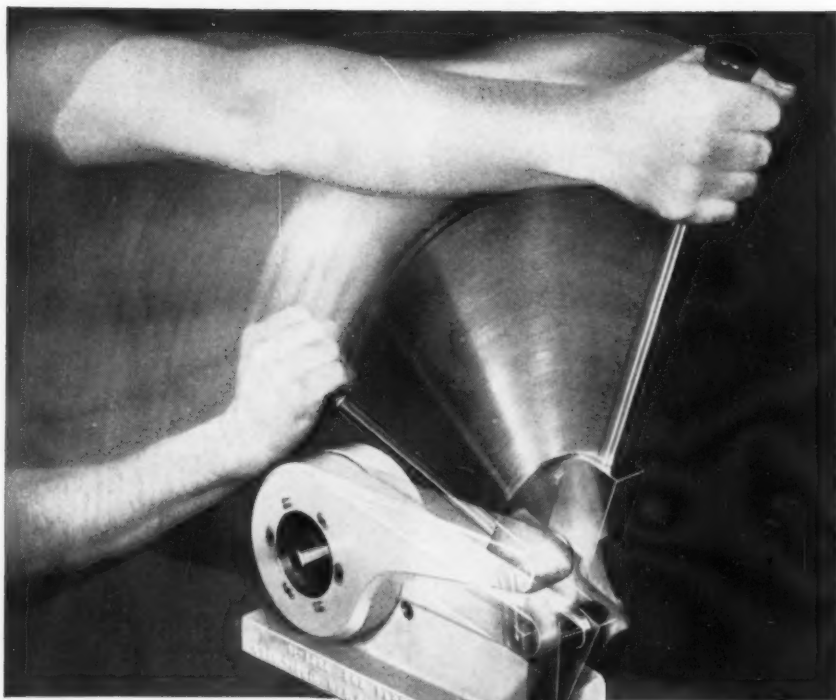
These three booklets will give you the facts on producing and measuring precision flatness and finish. Write for your copies today.



Crane Packing Company  
5344 Oakton St., Morton Grove, Ill.  
(Chicago Suburb)  
In Canada: Crane Packing Co., Ltd.,  
Hamilton, Ont.



**CRANE PACKING COMPANY**



## CUT BAR STOCK up to $\frac{5}{8}$ " Diameter

ACCURATELY, INSTANTLY WITH DI-ACRO® ROD PARTER

The shearing-breaking action of a Di-Acro Rod Parter allows most bar stock to be cut without burr and distortion. Cutting heads accommodate eleven different round stock sizes. Also special heads for cutting square, and other shaped bars.



New Rod Parter book is yours for the asking,  
Write or call today.

Consult the yellow pages of your phone book for the  
name of your nearest Di-Acro distributor or write:

Creators of "Die-less Duplicating"

O'NEIL-IRWIN MFG. CO., 314 8th Ave., LAKE CITY, MINN.

DI-ACRO  
POWER  
ROD  
PARTER



Instantaneous cutting action. Motor driven fly-wheel and other moving parts are housed in welded steel cabinet.

\*pronounced Die-ack-ro

**di-acro**  
PRECISION  
METALWORKING  
MACHINES



For fast, smooth cutting of aluminum flats, billets, rods, extrusions . . . or any other soft metals and materials . . . Simonds has the right saw or file for any particular job. Made of special job-rated Simonds steels . . . by top men working under ideal controlled conditions in Simonds famed windowless factory . . . every Simonds tool has the bonus-factor of finest performance and longest life. Yes, on any metal-cutting job, remember: "Say Simonds . . . and save".



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon  
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.  
Heller Tool Co., Newcomerstown, Ohio  
Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada

#### SOLID TOOTH SAWS

For best performance on automatic cut-off machines or saw tables and general run of work. Also furnished with carbide tips for production cutting.

#### SEGMENTAL TYPE SAWS

For thin wall sections and for smoother cutting of billets and thicker sections. Made with replaceable High Speed Steel teeth in segments.

#### INSERTED-TOOTH SAWS

For heavy duty cutting of billets and heavy sections. Replaceable High Speed Steel teeth.

#### "SABRE TOOTH" BAND SAWS

New design saw features a special tooth with a hook, for freer, faster cutting.

#### "RED END" HACK SAW BLADES

3 types, for hand or power cutting, each available in standard sizes and tooth-spacings, enable you to choose the one best blade for each job.

#### "RED TANG" FILES FOR ALUMINUM

Choose from a complete line . . . American Pattern, Milled Curved-Tooth, Rotary and Swiss Pattern File. First quality only.

For Fast Service  
Complete Stocks



Call your

**SIMONDS**  
Industrial Supply  
DISTRIBUTOR



**THIS**



**PRESS  
BRAKE**

**... combines**

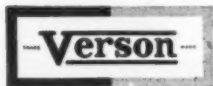
## **multiple production operations for TEMCO**

This Verson Press Brake accomplishes in *one stroke* all the jobs that formerly required several operations. Temco, Inc., Nashville, Tenn., manufacturers of gas heating equipment, uses the Verson Model No. 308 Press Brake to gang punch and notch corners and holes in flat sheet steel parts . . . speeding

the complete production process and reducing overall cost of operation.

If you now use press brakes, or are doing jobs that could be adapted to a brake, it will pay to investigate the cost-cutting opportunities offered by Verson Press Brakes. Write for Catalog B-55.

*A Verson Press for every job from 60 tons up.*



ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

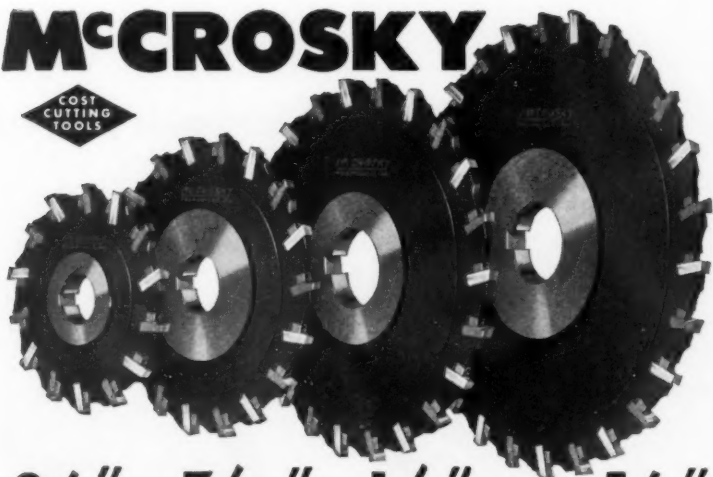
**VERSION ALLSTEEL PRESS CO.**

9303 S. Kenwood Avenue, Chicago 19, Illinois

So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES  
TOOLING • DIE CUSHIONS • VERSION-WHEELON HYDRAULIC PRESSES  
Circle No. 275 on Card, Opposite Page 65

# MCCROSKY



$3/8''$  -  $7/16''$  -  $1/2''$  and  $5/8''$

## THIN SLOTTING CUTTERS

4" — 5" — 6" — 8" — 10" and 12" in diameter  
with *Jack-Lock*® Blade Locking Wedges

• Designed specially for milling thin slots accurately and efficiently. Jack-Lock wedges extend the full width of the body. Consequently, locking pressure is applied parallel to the sides of the body, assuring true running at all times. Cutting faces of the blades are milled and ground to provide the axial rakes required. Easily converted to a half-side mill by simply inserting blades all of one hand. Extra large hubs provide added ruggedness and rigidity. Easily mounted on a grinding arbor for resharpening. Unsurpassed performance. Write for a bulletin today!



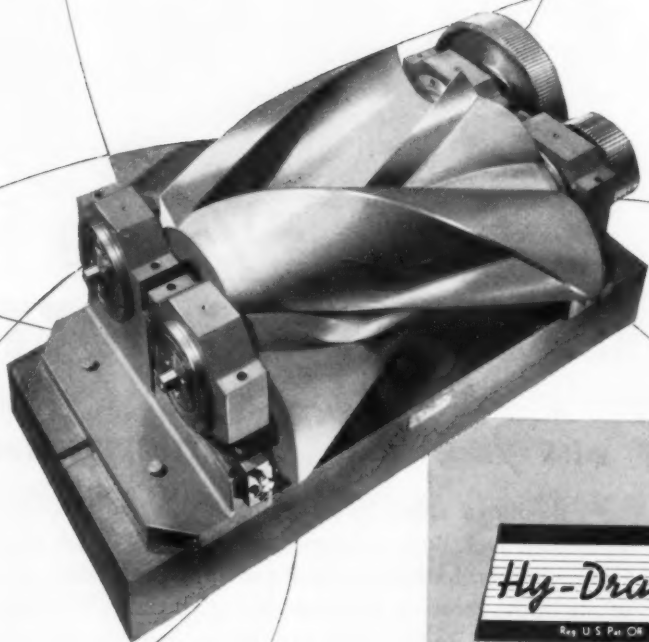
# MCCROSKY

**TOOL  
CORPORATION**  
MEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities

Circle No. 276 on Card, Opposite Page 65

**extremely difficult job ???**



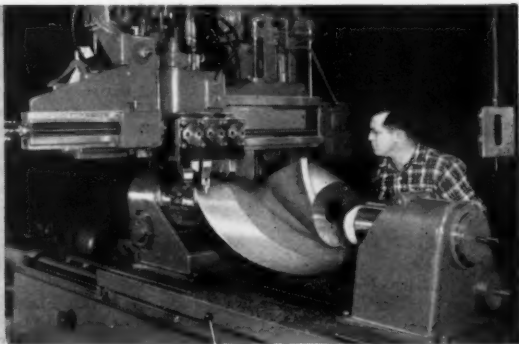
...not for a **hydraulic**  
**planer and duplicator**

Here's another complex machining job solved by using a Hydraulic Kopy-Kat, with a rotor generating Hydraulic Shaper-Planer.

The part is a blower and consists of two sections — a two lobe rotor and a four lobe gate. The helix angle of the rotor is approximately 32 degrees.

Hydraulic Drive is a natural for extremely difficult shaping, planing, slotting and duplicating. It produces accurate work with substantial savings in production time — often several hundred percent over other methods.

Ask a Rockford Machine Tool Co. representative for the latest facts on modern Hydraulic Shapers, Planers, Slotters, Shaper-Planers and Kopy-Kats.



**ROCKFORD MACHINE TOOL CO.**

2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS



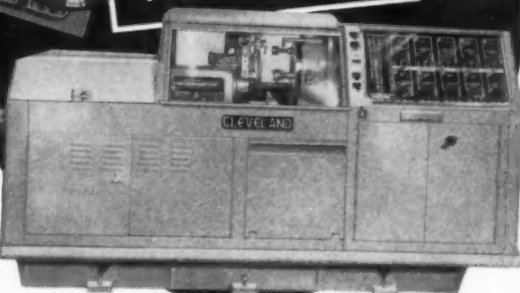
**DIAL CONTROL OF  
SPINDLE SPEEDS  
AND  
TURRET TOOL FEEDS ...**

**Specifications and Major Features  
of 1 3/8" and 1 5/8" Model AB  
CLEVELAND DIALMATICS**

	1 3/8" Model AB	1 5/8" Model AB
Max. Round Bar	1 3/8"	1 5/8"
Max. Hex. Bar	1 1/8"	1 1/2"
Max. Square Bar	3/4"	1 1/4"
Horsepower	7 1/2	7 1/2
Idle Motion Time	6.3 secs.	6.3 secs.
Stock Feed Stroke	9"	9"
Turning Length	4 7/8"	4 7/8"
Dia. Tool Circle	9"	9"
No. Turret Holes	5	5
Cross Slide Travel	4"	4"
Cross Slide		
Tooling Width	6 1/4"	6 1/4"

Infinitely variable spindle speeds.  
Spindle speed range—40 to 3200 R.P.M.  
Cleveland exclusive quick change collet.  
Quick change feedshell pads which require no screws.  
Variable tool feeds through electric feed drive.  
High speed Geneva turret index.  
Flame hardened double cross slides.  
Quick hand crank stock feed adjustment.  
Universal camming and easily adjustable cam drums.

Write for new  
1 3/8" and 1 5/8"  
Model AB Bulletin



**gives you maximum productivity  
with new 1 3/8" and 1 5/8" Model AB  
CLEVELAND DIALMATICS**

Cleveland brings to metalworking another major advancement in single spindle bar automatic machine design! Now, by making *dial settings* on the control panel, you preselect the *exact* forward and reverse tool feed—and the *exact* forward and reverse spindle speed—for each of five working turret tools. Each tool is completely and individually controlled throughout the cycle . . . *tuned* for maximum cutting efficiency! There are *no change gears*. Spindle speeds are electronically controlled and infinitely variable between 40 and 3200 r.p.m. You can preselect and set 10 different spindle speeds for each machine cycle. Spindle speed changes and reversals are entirely automatic and are made through electric clutches, which make the number of changes or reversals per minute practically unlimited.

A few of many modern features of these new Cleverlands are listed at left. It will pay you to get full information. Get in touch with a Cleveland sales engineer. He'll give you the full story on the many economies these new Cleverlands can bring to your plant.

**THE CLEVELAND AUTOMATIC MACHINE COMPANY**

Manufacturers of a Complete Line of Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

Circle No. 278 on Card, Opposite Page 63

**4934 Beech Street  
Cincinnati 12, Ohio**

SALES OFFICES: CHICAGO  
CLEVELAND • DETROIT  
HARTFORD • S. ORANGE

## FEATURES THIS MONTH

MACHINE AND TOOL

## blue book

**The Winners of Blue Book's \$2,500 50th Anniversary Contest are announced.** The final selection from the 198 entries received was by unanimous decision of the judges. Photos of the nine prize winners are reproduced in this feature article as well as a synopsis of the prize winning idea.

**Page 105**

**Why this indifference to the Hoover Commission findings?** And what are Congressmen doing about getting action on this important report? Read about this and other developments in the Nation's capitol in the Washington Roundup.

**Page 95**

**Case Study of a safety plan in action** by Leonard C. Schmidt. The author, who is works manager of an eastern pressed steel company, tells how the plan works, how top management gets behind it and how the important safety committee functions.

**Page 110**

**Flexible reinforced wheels** by Richard C. Bush. These new wheels offer many advantages including toughness, flexibility, fast cutting action and safety. Their built-in strength and safety are the reasons for their great utility and will cut costs in your plant.

**Page 116**

**How Douglas Aircraft solved its deep hole drilling problems** by A. R. Felando. Here is an 11 page feature which presents tables showing the ratio of hole diameter to depth,

finishing and diameter tolerances, feeds, speeds. The type of gun drill most generally used at this plant is the target type with coolant, but a high speed steel center cut gun drill can be used without coolant in a vertical position when the material does not exceed .375" in thickness.

**Page 132**

**The horizons are widening for Flame Hardening** by M. R. Scott. The really important and exclusive advantages of this process are to be gained in the field which is quite beyond the range of furnaces or induction hardening equipment.

**Page 148**

**Installation of a Numerical Cam Miller in Britain** is believed to be the first practical example of automation applied to machine tool control in that country.

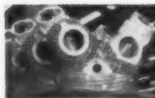
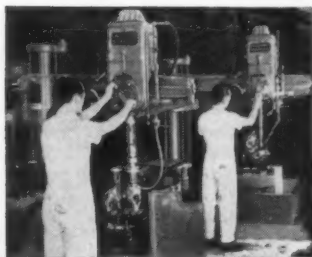
**Page 161**

**Can you disregard length of service and promote a junior man on the basis of a supervisor's opinion only?** This and two other provocative labor relations questions are discussed in the feature, Right and Wrong in Labor Relations.

**Page 175**

# LONG LIVED ACCURACY

in this high speed  
Super Service  
Radial



Drilling, Core Drilling and Reaming Alloy Steel Cheek and Counterweights of Aircraft Engine Crankshafts. Reamed holes are held accurate within .0005".

3 and 4 foot arm.

Spindle speeds up to 3500 r.p.m. without belts.

This simplified, very versatile, speedy, accurate and durable machine is rigid and easy to handle.

A distinctive feature is the elimination of spindle driving clutches as forward and reverse rotation is thru a reversing motor . . . very fast for tapping work.

Furnished with 9" column with 3' or 4' arm and 3 HP driving motor.

Get the details. In their range, these machines are most economical and productive.

Write for Bulletin R-21C.

**CINCINNATI  
BICKFORD**



RADIAL AND UPRIGHT DRILLING MACHINES

**CINCINNATI BICKFORD DIVISION**

GIDDINGS & LEWIS MACHINE TOOL COMPANY

OAKLEY, CINCINNATI 9, OHIO, U.S.A.

Circle No. 279 on Card, Opposite Page 65

## AS THE EDITOR SEES IT

MACHINE AND TOOL

blue book

### Who's In Charge Here?

One of the most baffling aspects of our industrial era is the galaxy of titles of our manufacturing personnel. It's getting difficult to determine who does what and who has charge where.

Look at some of the titles in the metalworking industry. Among engineers we have: Process-, Methods-, Planning-, Manufacturing-, Plant-, Application-, Production-, Project-, Factory-, Industrial-, Design engineer.

A Process engineer at **A** is a Methods engineer at **B**; at **C** they have neither, only a Manufacturing engineer. A plant engineer at **A** is a Factory engineer at **B**; at **C**, he is a Production engineer. However, a Production engineer at **D** is the same as a Process engineer at **B**, which if you recall is not the same as a Process engineer at **A**. The Planning engineer at **E** is the same as Expediting engineer at **G**. Neither **A** nor **B** have these titles, those job functions are filled by the Service engineer and the In-Work Group Leader.

In the managerial category we have: Production-, Manufacturing-, Works-, Plant-, Factory-, Industrial-, Shop manager; in addition we have: Master Mechanics, Superintendents and the various V.P.'s in charge of Production, Manufacturing, Processing.

Coming a step down we must make sense out of these: Supervisor, Leader, Foreman, Group Leader, Lead Supervisor, Department Head, Group Head,

etc. You can build your own list and have a lot of fun.

As we examine various departments we find titles within titles: Die Room Foreman for Processing Department, Group Leader for Production Dies, and in the same company: Die Superintendent. Some others are: Die Leader, Die Group Engineering Manager, Die Room Foreman, Die Supervisor, Die Department Process Manger. If you think you can determine who's in charge here let us tell you that the Die Superintendent is head of the Drafting Department, the actual boss is the Foreman, Die Building. The Die Supervisor is also head of Die Inspection, boss of that company's die department is the Die Leader.

And dodging madly through this jungle of engineers, leaders, foreman and supervisors are those wonderful people the Tool Enginners who know exactly what they're doing, but aren't quite sure whether they should consider Tool Engineer a generic term or a profession different from that of Production, Process, Methods, Factory engineering.

It's all very confusing. Better stick to the good old, "Hey, you, with the worried look," or better still, "Hey, Buster!"

*Wm. J. Schleuter*



Straight Turning



15° Lead Angle Turning



30° Lead Angle Turning



45° Lead Angle Turning



Straight Facing



15° Lead Angle Facing

## ***NOW*** V-R TOOLHOLDERS Available to Handle 90% of all Machining

***Negative and 6° Positive Rakes,  
Right and Left Hand Styles  
for All Standard Carbide Inserts***

Carbide tooling costs can be cut 10% to 200% by replacing standard brazed tools with V-R toolholders and carbide inserts. Grinding costs are eliminated or reduced; carbide costs are reduced as is carbide inventory; tool changes are faster and there is less downtime. Get complete facts about the complete V-R toolholder line—.

### **ASK FOR NEW TOOLHOLDER CATALOG**

Tells why a V-R toolholder is fastest, simplest-to-use. Gives complete data and prices for toolholders and inserts. Call your V-R Representative or Distributor, or write.



Manufacturers of cemented carbides and TANTUNG cast alloys

# **Vascoloy-Ramet Corporation**

SUBSIDIARY OF TANTUNG METALLURGICAL CORPORATION

854 Market Street • Waukegan, Ill.

Circle No. 280 on Card, Opposite Page 65

## LETTERS TO THE EDITOR

blue book

**Likes "New Look"** . . . You are to be commended on the new BLUE BOOK layout and attractive format. You're keeping up with the latest presentation as well as up-to-date, timely articles we in the industry find so valuable.

M. Baker, Technical Writer  
Oakland, Calif.

**WE would appreciate** your sending us four tear sheets of the article, "Apprentice Selection Discussed at New York Meeting," pages 197-8 of your April issue.

Incidentally, we like BLUE BOOK's new look very, very much.

Marvin Reese  
Fred Wittner Advertising

**I have received** Hitchcock's Machine & Tool Directory—1956 Edition. This is the most compact directory for machines and tools that we receive and it is kept handy at all times for a reference.

Your monthly edition is also a very interesting magazine for its editorials, current information and other articles too numerous to mention.

Congratulations on your Fiftieth Year of publication of BLUE BOOK; our hope for fifty more.

A. R. Kidd, Gen. Roundhouse Foreman  
Chicago, Milwaukee, St. Paul & Pacific  
Railroad Co.

### Who Goofed?

At the end of Harry Conn's article in the March issue, it states, "End of part 2. Part 3 will appear in March."

Thinking, of course, that it would be in the April issue, I searched and found it not. I am inclined to believe, because of the fact that a Bibliography appears at the end of part 2 that that is "The end." However, since the part 1 in February has absolutely no indication of the end for that part, how do I know?

Anyway, it is an excellent article. I

haven't had time to really go thru it as I intended to, but nevertheless, it should be of great interest to many of our 'engineers' who came up the road of experience without formal engineering training. Keep up the good work.

LEE F. BERNHARDT, P.E.  
CHIEF ENGINEER  
"DESIGN"

*We allow ourselves one error a year and now "we've had it!" Part 2 is the end.*

## Engineering

After reading the initial article of your new series "Engineering For You and Me," entitled "Stress and Strain Simplified," I wish to express my great interest in it.

In keeping with that interest, I would like 5 copies or tear sheets of this article and the subsequent ones of the series.

The intent is to pass this knowledge on to our apprentices to further our and their education. . . .

G. M. LAWRENCE  
IND. ENGINEER  
MILWAUKEE VALVE CO.

*Tear sheets have been sent to Mr. Lawrence, but because of the big demand for these our supply is now exhausted and we cannot fill any more requests.*

## Ceramic Tools

We would appreciate receiving three copies of the article entitled "Faster, less expensive cutting tool passes first hurdle," Vol. 50 No. 12, December 1955 pages 110-112.

L. M. DIEDRICHS, LIBRARIAN  
FERRO CORP.

*Tear sheets sent.*

## Lathes

We have purchased a Rahn-Carpenter lathe. Could you tell us who bought them out or where there is a company that makes this lathe? We wrote to the Rahn-Carpenter Co. in Cincinnati, Ohio, and the address was unknown.

JOE STANLY  
JOE'S MOTOR SERVICE

*The Nebel Machine Tool Co., 3401 Central Parkway, Cincinnati 25, Ohio, bought out this company. All information can be obtained from them.*

## Information, Please

I am wondering if perhaps you can be of service to us in directing us to the proper people who could build for us a table saw either hand fed or automatic, capable of sawing without burr with the minimum of brass dust, ball point pen brass tubing with .125 O.D. and .103 I.D.

If possible, we would like to saw these tubes from five to ten at a time, and I assume that the type saw blade which will be used would perhaps be a jewelers saw. . . .

REMMIE L. ARNOLD, JR.  
REMMIE ARNOLD PEN CO., INC.

Sometime ago we observed an advertisement of a firm offering a set of dies, two dies to a set, which would notch out a corner of a steel sheet and fold it so as to produce the corner of a box. All four corners could be cut and formed in this manner and boxes thus produced from steel sheets.

From this meagre information, could you tell us who the likely manufacturer of such equipment might be?

A. ZION, PRESIDENT  
DOMINION LOCK CO., LTD.

Information as to the manufacturer who is now building the Gray Machinery Co. (Philadelphia, Pa.) line of equipment is desired.

J. H. QUIRE, PROJECT ENG.  
AERO-TEST EQUIPMENT CO., INC.

*Any information you can give readers Arnold, Zion and Quire will be greatly appreciated.*

We would greatly appreciate your furnishing us with the names and address of manufacturers of Hand Electric Arc Engravers, also called Etchers.

JACOB FREIDUS  
AARON MACHINERY CO., INC.

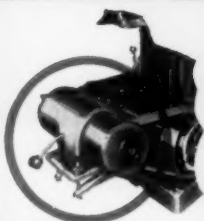
*List sent.*

• • •

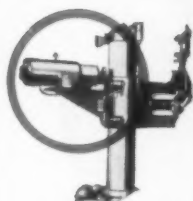
**GET**

# New Performance

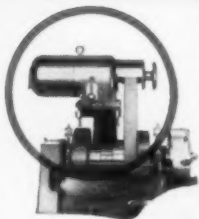
## FROM OLD MACHINE TOOLS



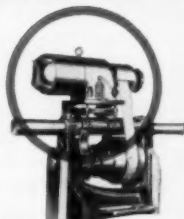
SHAPER



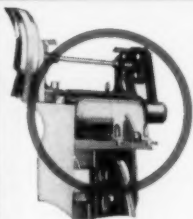
RADIAL DRILL



LATHE



MILLING MACHINE



PLANER

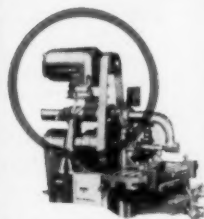


## LIMA GEARSHIFT DRIVES

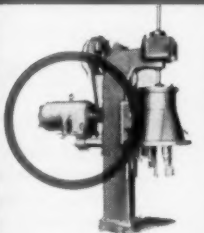
Install modern efficiency in old machine tools—get higher production at lower operating costs!

Lima Gearshift Drives provide outstanding flexibility—available with either four or eight output speeds to assure a correct range of speeds for every job. Full rated horsepower is delivered in all speeds.

Why not let our experienced Sales Engineering Staff show you how easily your machines can be motorized—an accurate survey of your equipment involves no obligation. Write us today for complete information.



MILLING MACHINE



MULTIPLE SPINDLE  
DRILL



THE LIMA ELECTRIC MOTOR CO., 252 FINDLAY RD., LIMA, OHIO

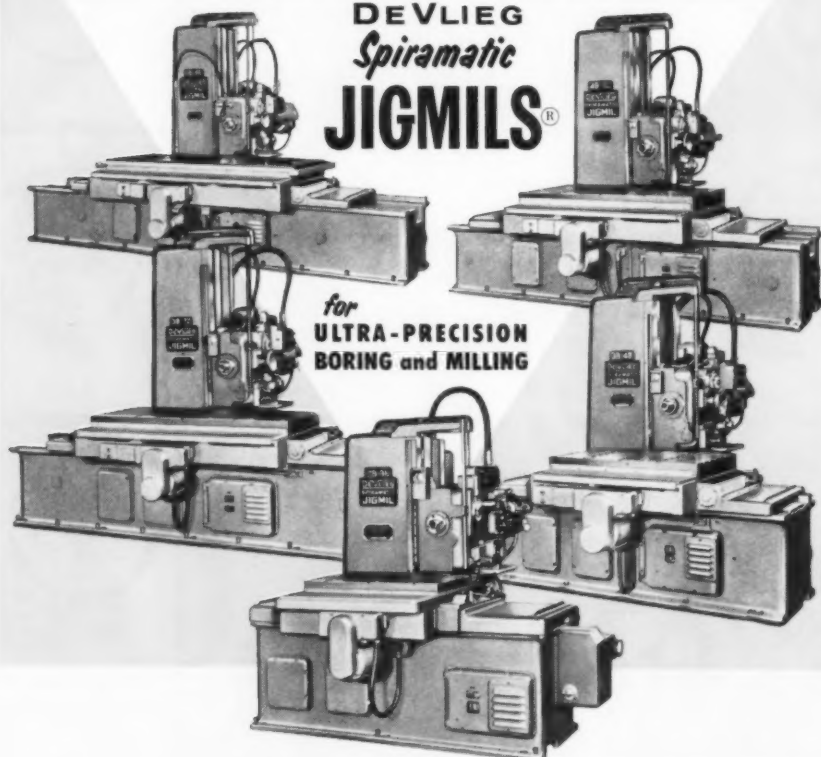
Representation throughout the U. S., Canada and abroad

**FIRST...FOR DRIVES...MOTORS**

Circle No. 281 on Card, Opposite Page 65

Every day... *Everywhere*... Your Competitors are using

DEVLIEG  
*Spiramatic*  
**JIGMILS®**



for  
**ULTRA-PRECISION  
BORING and MILLING**

***THE "ACCEPTED" MACHINE FOR JIGLESS PRODUCTION OR ONE-PIECE JOBS***

The Devlieg System of "JIGLESS BORING"—★ Eliminates expensive jigs ★ Permits complete flexibility of product design ★ Insures interchangeable assembly of parts without hand fitting.

Devlieg JIGMILS are widely used in toolrooms and experimental shops for machining all types of jigs, fixtures and experimental parts to precise limits of accuracy with a minimum of operator skill.

*Come to Detroit*  
**SEE A PRACTICAL  
DEMONSTRATION OF THE  
JIGMIL TECHNIQUE**

**DEVLIEG MACHINE COMPANY**

*Write for Illustrated Catalog*

450 Fair Avenue • Ferndale  
DETROIT 20, MICHIGAN

## ROUND-UP OF WASHINGTON NEWS

WILLIAMSON BROTHERS  
blue book

**Machine Tool Unfilled Orders Up.** The figure is \$95.4 million, as of March. This is 10.8% up from February and a gain of 51% over March, 1955. Machine tool builders are pressing themselves to reduce the backlog, however; the \$74 million in shipments last month is a 24% increase over March of last year.

**Cutback in Auto Production.** Dealer stocks are not moving as anticipated, but the spring sales look bad only in comparison with the record year of 1955. Reports are that Ford trimmed May production by 2%, another volume producer by 10%. Only bright spot in the auto picture is used cars where sales are up considerably.

**Employment at Peak.** There were 63,100,000 persons holding jobs in March, a new all-time record for the month. It was 500,000 more than February and 2.5 million more than March, 1955.

### Why This Indifference To The Hoover Report?

● Little evidence of activity on the part of Congress to the Hoover Commission's recommendations has been forthcoming in this session of Congress.

When confronted with the necessity to explain their apathy, Congressmen report that mail from constituents on the subject has been very light. Committeemen handling the bills embodying the Hoover recommendations defend their actions with assertions that they have received little evidence of any popular demand for the legislation.

Businessmen who have studied the Commission's recommendations

on Budget and Accounting, Personnel and Civic Service and Business Enterprises know that it is possible through favorable action to lay the basis for tremendous savings in annual operating costs in future years. However, any action on the bills embodying the recommendations during this session—now over the half-way point—depends on the interest and support manifested by businessmen and their organizations.

There is a pamphlet available that lists bills to effect the Hoover recommendations and the committees to which the bills have been referred. Entitled, "Check List for Congressional Action of Hoover

Commission Recommendations," it is available free. Write to Chamber of Commerce of the United States, Washington 6, D.C., if you are interested.

### **Problem of Preparedness Needs Urgent Action**

Now that the Vance Plan—requiring appropriations for the purchase of machine tools considered especially critical—has been abandoned, each Defense Department is now on its own. This means that each department is confronted with these responsibilities:

1. Its own machine tool preparedness with respect to vital key machines.
2. Maintenance of its machine tool reserve and replacement necessitated by obsolescence.
3. Procurement for current requirements.

In other words, this "do-it-yourself" program requires each of the departments to review its facilities periodically and budget accordingly for the replacement and modernization of production facilities.

The National Machine Tool Builders Association is concerned by the fact that this problem of machine tool reserve expansion and modernization has been accorded lip service only. Having lived through the machine tool crisis of three successive wars, it knows the time factor involved. It has gone

on record as being concerned about the consequences should the nation make the same mistakes a fourth time.

According to *Machine Tool Progress*, official organ of NMTBA, with regard to the type of machine tools that require a long time for their manufacture: "There must develop a keen understanding of the vital role that machine tools will play in a mobilization throughout the echelons from top to bottom in each of the military departments . . . aggressively spearheaded by the Office of Defense Mobilization. And most importantly, there must be a concerted drive, with a pronounced emphasis on follow-through."

### **Propose Law Requiring Disclosure Of Welfare Fund Finances**

The subcommittee on Welfare and Pensions' proposal for a federal disclosure law applying to all welfare and pension plans has stirred up a hornet's nest. It recommends that all plans covering 100 or more employees to register with the Securities and Exchange Commission; henceforth each year file reports containing complete details about operations, financial and otherwise. Between 30,000 and 40,000 plans would come under such proposed federal regulations. This includes those plans

# 1800 Stainless Steel Threads



LANDMATIC HEADS are every day saving production dollars for the Crawford Fitting Company of Cleveland by low tool cost and minimum machine downtime.

This company manufactures Swagelok Tube Fittings ranging from  $\frac{1}{8}$ " to 1" in diameter. These fittings are produced from stainless steel tees of austenitic type 316 cold-worked to a Brinell hardness of 250. In producing the 7/16" fitting, for example, (as illustrated) 20-pitch straight UN threads are cut close to the shoulder 5/16" long to Class 3 fit.

LANDMATIC Hardened and Ground Heads, such as used by Crawford, are designed to produce threads to Class 3 or 4 fit in all types of tough materials. Unusually heavy construction and sound funda-

mental die head design assure the rigidity necessary for accurate threads. The inherent features of the design of the Landis Tangential Chasers and their proper manufacture and hardening, developed during 50 years of threading experience, ensure long chaser life and low threading cost.

If you require threads on stainless steel or other tough material, LANDMATIC Hardened and Ground Heads offer you these same cost-saving features. Please send specifications and write for Bulletin F-80 for additional information.

**LANDIS** Machine  
**COMPANY**  
WAYNESBORO, PENNSYLVANIA, U. S. A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

## Dynamic Growth In The Next Decade

While total population of the U.S. rose from 132 million in 1940 to 166 million at present, an even faster rate of increase is foreseen over the next decade, the Census Bureau forecasts. This 34 million increase in itself will create an increasing demand for goods. When you figure that this increasing market will be abetted by a rising standard of living you should be prepared for a dynamic demand for goods of all kinds.

In the six year period, 1947 to 1953, the number of families earning \$4,000 or more annually increased from 16.5 million to 28.3 million. With rising income comes a rise in the standard of living and projections for the next decade are that the buying power of all classes of workers will increase.

Another fact that is being taken into consideration more and more by the economists is the increasing number of persons under 20 and over 65. At present these two classes of unproductive people are 45 per cent of the population. In 1965,

they will account for 48 per cent of total population.

## 2nd Quarter Export Quota For Aluminum Scrap

Export licensing of aluminum scrap for the second quarter of 1956 will be limited to 4,000 short tons.

The quota, which reflects the continued tight domestic supply situation, is a reduction of 2,000 short tons from the 6,000-ton quota set for the first quarter. It includes new and old aluminum scrap and remelt ingots.

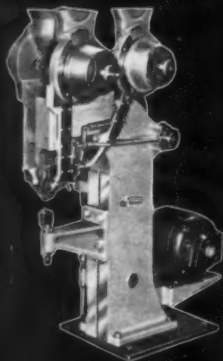
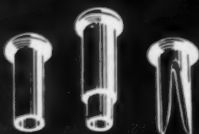
Primary and secondary aluminum metal and alloys in crude form continue under open-end licensing.

There are certain changes in the special licensing requirements for these aluminum materials. Exporters no longer are required to submit evidence of availability in support of their applications to aluminum scrap under quota. However, evidence of availability to export now must accompany applications covering primary and secondary aluminum metal and alloys in crude form. • • •

**Steel Output Up.** Steel production for the first quarter, 1956, totalled 31,868,226 net tons. This all time record was reached because of record production achieved in March—10.9 million tons—and in January—10.8 million net tons. These figures were reported by the American Iron and Steel Institute. The Institute also reports that the payroll of the iron and steel industry was an estimated \$3,597,556,000—highest total in the history of the industry. Average hourly payroll for 1955 was \$2.509, against \$2.333 for 1954. Pensions, social security and insurance cost an average of 21.3 cents an hour.

AT *Chicago Rivet* ALL 3

will reduce your  
Fastening Costs



*Chicago Rivet*

& MACHINE CO.

9610 West Jackson Boulevard,  
Bellwood (Chicago Suburb) Illinois  
Branch Factory: Tyrone Pa.

New Rivet Catalog  
contains engineering  
data, list of popular  
semi-tubular, full  
tubular, split and  
shoulder rivets and  
popular automatic rivet  
setters. Write for copy.



## **rivets**

**Semi-Tubular,  
Split and Shoulder**



You avoid machine down-time because every semi-tubular, full tubular, split, shoulder or special rivet is precision made and hand inspected to assure free, non-clogging movement in automatic setters.

## **rivet setters**

Your fastening costs are less because Chicago Rivet makes machines that set from one to seven rivets at a time. Riveting is automatic and may involve the use of special indexing fixtures, adjustable riveting centers, and top or bottom rivet feeding and other mechanisms, controlled by solenoids or air cylinders or both.

## **engineering**

The recommendations of Chicago Rivet Engineers are most valuable. Their knowledge of rivet fastening techniques, gained from solving thousands of manufacturers' fastening problems can help make your product more competitive. Calling Chicago Rivet is a habit-formed procedure with many companies. You incur no obligation when you use the service of Chicago Rivet Engineers. Send a blue print or sample assembly with your inquiry.

where there is no collective bargaining, where there is no union to represent the employees.

Coming out in full support of the proposal were subcommittee members Douglas (D.-Ill.), Murray (D.-Mont.) and Ives (R.-N.Y.). Reserving judgment were Senators Neely (D.-W.Va.) and Allot (R.-Colo.). Testimony from investment experts who administer multi-million dollar pension funds was that general economic upheaval might result when they reveal publicly their investment portfolios and when the public learns about their handling of such large sums.

The committee's recommendations are included in a bill which Senator Douglas has presented to Congress. Although there is a possibility that hearings will be held on the measure in the senate chambers during this session, there is little likelihood that action will be taken this session.

### **Investigate Businessmen In Government**

The Democrats continue to take pot shots at businessmen in top-level policy making posts in government. These attacks are no longer concentrated on cabinet members. With the underlying motive being to convince the American voters that the Eisenhower administration is dominated by big business, the House Government Operations Committee is using their recently acquired \$500,000 appropriation to investigate the policy making businessmen serving without compensation.

Very conspicuous is the attitude of the Republicans in Congress in not coming to the defense of their fellow GOPers. The only logical explanation for this is that too many of these top executive officials are not seeing eye-to-eye with GOP Congressmen.

**Plastic Tools in Industry.** Sales of plastic tool materials indicate how industry is responding to cost-saving prospects. Examples: At McDonnell Aircraft Corp., St. Louis' toolmakers are building a family of 250 plastic dies, fixtures and other tools for making canopies and windshields for airplanes. A. C. Waldvogel, methods engineer, asserts that with plastic they can do the job 25 to 50 per cent faster with a 40 per cent saving in labor costs. At Chrysler Corp., more than 30 per cent of the tooling program has been taken over by plastics. Studebaker-Packard Corp. is launching a major program to eliminate machining, grinding and finishing operations in an effort to hold its place in the highly competitive auto market. However, even the most avid plastic tool enthusiast admits that for long run productions steel is still the best tool material.

# Cut DIE COST...



## ...BEFORE it gets to the toolroom

Nothing makes a diemaker meaner than a sticky punch holder. Count the times he removes it building up a die and it's foolish to save a few dollars buying second-rate die sets.

That can't happen with Detroit Die Sets because we are constantly working to improve our die sets. Recently developed ball bushings are an example. Extensive testing, in our own and customers' plants, has proven their value. Now, they're available on Detroit Die Sets to extend production runs and make a diemaker's job easier.

Details on the use of ball bushings plus other helpful information on cost-cutting Detroit Die Sets are available upon request. Write today, or see your local representative—he's as near as your phone.

Offices  
in Principal  
Industrial Centers

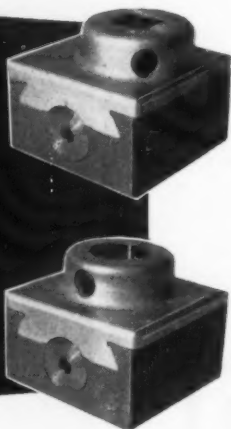
2895 WEST GRAND BLVD.  
DETROIT 2, MICHIGAN

**Detroit**  
DIE SET  
CORPORATION

*Which boring head will do your job?*

**CRITERION** makes a wide range —  
1½ to 7 inches in diameter.  
Bore accurate holes ¼ to 20 inches.

**CRITERION** Heads feature widely  
spaced graduations — Easy reading  
— Accurate adjustment — Rugged  
construction — Dependable opera-  
tion. Built for long life and chatter-  
free performance.



Ground shanks  
and adapters  
for all popular  
machine tools

## CRITERION TOOL PRODUCTS



Select your boring head  
for ROUND or SQUARE  
shank tools.

### **DIVERSIFIED OPERATION**

Check the application of  
these tools on Turrets or  
Automatic Lathes.

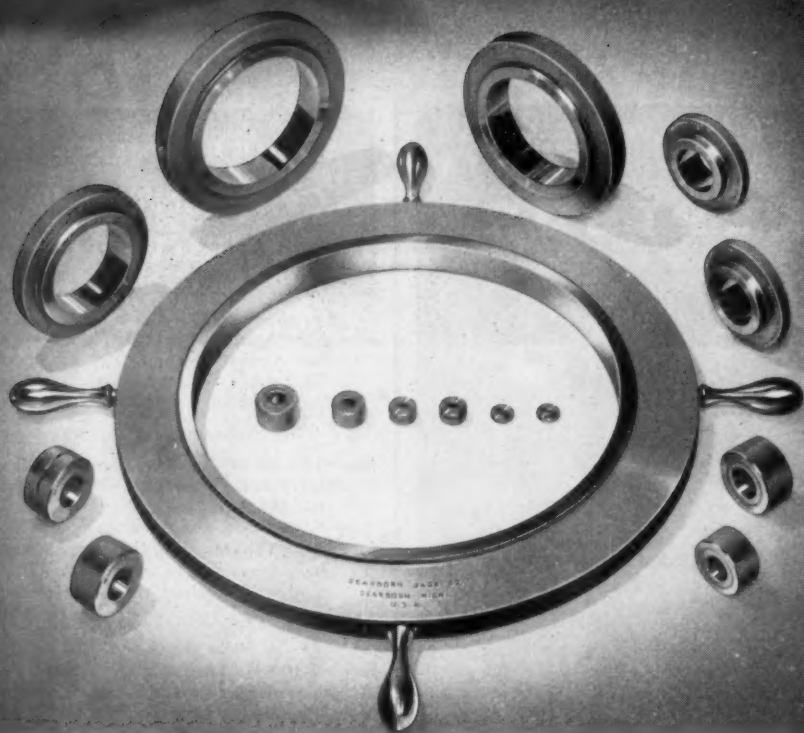
### **MAXIMUM OFFSET TRAVEL**

Save time—Money—Elim-  
inate excessive tool change.

**BORING TOOLS**  
Boring, grooving and  
internal threading  
tools are stocked in  
High Speed or Carbide.

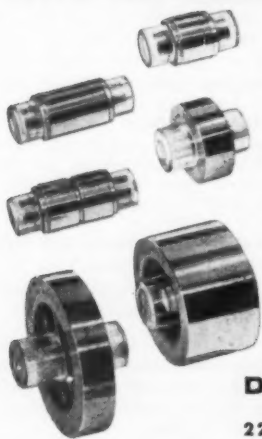
**CRITERION MACHINE WORKS**  
765 WEST SIXTEENTH STREET  
COSTA MESA, CALIFORNIA

Consult your dealer or write for free catalog.



*For Finer Accuracy, Higher Quality, Lower Gaging Costs!*

## **DEARBORN MASTER SETTING RINGS MASTER SETTING DISCS**



When it comes to controlling internal and external work dimensions, you'll find it pays to set your production and inspection gaging equipment with Dearborn Master Rings and Discs. Produced to A.G.D. Standards, they are made of the finest quality steel... stabilized, ground, and precision lapped to specified size. All are subjected to rigid, 100% inspection under closely controlled laboratory conditions to assure the ultimate in uniformity and accuracy. And they are available with either steel or chromium plated gaging surfaces in a wide range of sizes to meet your particular requirements... Master Rings from .029" to and including 12.260", Master Discs from .150" to and including 8.510".

**IF YOU BUY GAGES**, Dearborn's 48-page illustrated catalog is designed to save you time. It's available to Inspection, Production, and Purchasing executives... send for it today!

### **DEARBORN GAGE COMPANY**

"Measuring in Millionths for Three Generations"

22038 Beech Street • Dearborn, Michigan



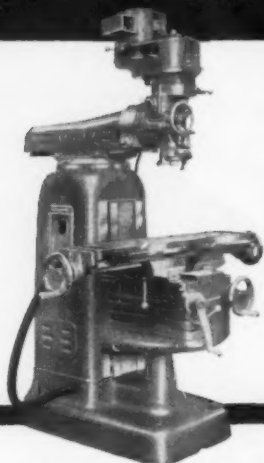
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE UNITED STATES AND CANADA  
Circle No. 287 on Card, Opposite Page 63

**FOR LOWER COST  
HIGHER QUALITY**

**WESTBURY**

**VERTICAL MILLS**

**Models 1-S and 1-R**



Hardened and ground high-speed ball bearing spindle—5" quill travel, micrometer depth stop—Three feeds, .0016; .003; .005—Rapid spindle change over, 8 speeds (80-2713) — Dovetailed over-arm (1-S)—Round over-arm, (1-R)—Precision angle setting control — Rigidly mounted table — 42 $\frac{3}{4}$ " x 9 $\frac{1}{16}$ " — 30" longitudinal range, 10" transverse, 16" vertical—Positive locks—Motor, 1.5 H.P. — Weight, 2200 lbs. Available with duplicating attachment Mod. FR for hydraulic precision reproduction of molds, patterns, and templates in any material.

Write, wire  
or phone for  
descriptive  
literature



Distributors  
in principal  
cities

**Maserati Corporation of America  
Westbury, L.I., N.Y.**

Circle No. 288 on Card, Opposite Page 65

100

## **MEETINGS CONVENTIONS EXHIBITIONS**

**June 3-6—American Gear Mfrs. Association,** 40th Annual Meeting, The Homestead, Hot Springs, Va. Association Headquarters—1 Thomas Circle, Washington 5, D.C.

**June 3-8—Society of Automotive Engineers, Inc.,** Summer Meeting, Chalfonte-Haddon Hall, Atlantic City, N.J.

**June 5-8—The Material Handling Institute, Inc.,** Exposition, Cleveland Public Auditorium, Cleveland, Ohio. Institute headquarters—1 Gateway Center, Pittsburgh 22, Pa.

**June 7-10—National Metal Trades Assn.** Western Plant Management Conference, Dell View Hotel, Lake Delton, Wis. Association headquarters—337 W. Madison St., Chicago 6, Ill.

**June 17-21—American Electroplaters' Society,** Annual Convention, Hotel Statler, Washington, D.C. Society Headquarters, 445 Broad St., Newark 2, N.J.

**June 17-22—American Society for Testing Materials,** Annual Meeting and Exhibit, Chalfonte-Haddon Hall, Atlantic City, N.J. Society Headquarters—1916 Race St., Philadelphia 3, Pa.

**June 18-29—Mass. Institute of Technology** 2-week Special Summer Course on Metallurgy of Iron and Steelmaking. For full details address: Summer Session Office, M.I.T., Cambridge 39, Mass.

**June 21-22—Aviation Distributors and Mfrs. Assn.,** 27th Meeting, Grove Park Inn, Asheville, N. C. Association headquarters—1900 Arch St., Philadelphia 3, Pa.

**June 21—Cutting Tool Mfrs. Assn.,** Annual Golf Meeting, Lochmoor Country Club. Association Headquarters—416 Penobscot Bldg., Detroit 26, Mich.

**MACHINE and TOOL BLUE BOOK**

June 24-26—Alloy Casting Institute, Annual Meeting, The Homestead, Hot Springs, Va. Institute Headquarters—32 Third Ave., Mineola, N. Y.

June 24-27—Drop Forging Association, Annual Meeting, The Homestead, Hot Springs, Va. Association Headquarters—419 S. Walnut St., Lansing 33, Mich.

June 25-29—American Institute of Electrical Engineers, Combined Summer and Pacific General Meeting, Fairmount Hotel, San Francisco, Calif.

July 25-28—National Tool & Die Mfrs. Assn. Meeting, Stanley Hotel, Estes Park, Colo. Association headquarters—907 Public Square Bldg., Cleveland 13, Ohio.

August 6-8—Society of Automotive Engineers, Inc., National West Coast Meeting, Mark Hopkins Hotel, San Francisco, Calif.

Sept. 7-9—Metal Powder Assn. Annual Fall Meeting, Homestead, Hot Springs, Va.

Sept. 9-12—National Metal Trades Assn. Eastern Plant Management Conference, Essex-Sussex Hotel, Spring Lake, N.J. Association Headquarters—337 W. Madison St., Chicago 6, Ill.

Sept. 17-21—Instrument Society of America 11th Annual International Instrument Automation Conference and Exhibit, New York Coliseum, New York, N.Y. Society headquarters—1319 Allegheny Ave., Pittsburgh 33, Pa.

Sept. 25-28—Association of Iron and Steel Engineers, Annual Convention and Exposition, Cleveland Public Auditorium, Cleveland, Ohio. Association headquarters—1010 Empire Bldg., Pittsburgh 22, Pa.

Sept. 26-28—American Institute of Mining and Metallurgical Engineers, Rocky Mountain Mineral Conference, Salt Lake City, Utah. Institute headquarters—29 W. 39th St., New York 18, N. Y.

Sept. 30—Oct. 4—Pressed Metal Institute, Annual Meeting, Pocono Manor Inn, Pennsylvania. Institute headquarters—3673 Lee Road, Cleveland 20, Ohio.

Oct. 1-3—National Electronics Conference, Hotel Sherman, Chicago, Ill.

Oct. 1-4—Metal Mining & Industrial Minerals Convention-Exposition, Shrine Exposition Hall, Los Angeles, Calif. Congress headquarters—Ring Bldg., Washington 6, D.C.

June, 1956

# QUALITY AT LOW COST

**QUEEN CITY HEAVY DUTY  
GRINDERS  
DISC GRINDERS  
AND BUFFERS**



**QUEEN CITY Heavy Duty Disc Grinders and Buffers** save you money when you buy and during every hour of use. Ruggedly designed, they feature heavy duty bearings and motors. So good they're offered on a 30-day trial, yet priced 20 to 30% under competing makes.

Choose from the complete range of **QUEEN CITY Grinders and Buffers** . . floor and bench types . . in sizes from 1/3 to 10 H.P.

WRITE FOR FREE  
CATALOG TODAY!

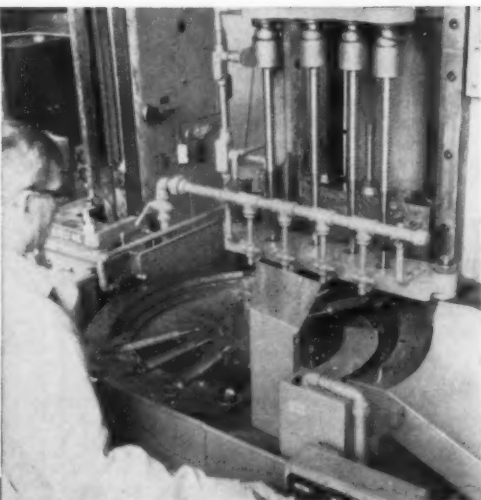
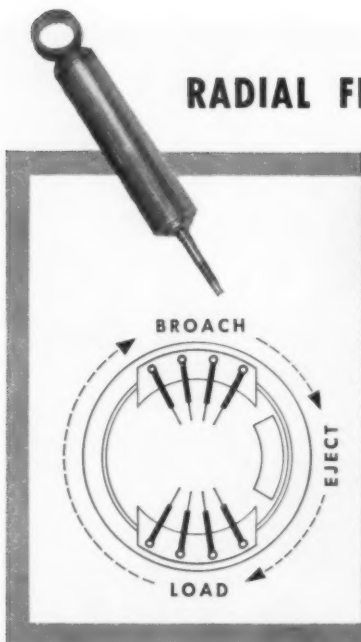
**QUEEN CITY  
MACHINE TOOL CO.**

**QUEEN CITY  
MACHINE TOOL CO.**

3912 Kellogg Ave., Cincinnati 26, Ohio

"High Quality—Low Cost—For Over 50 Years"  
Circle No. 289 on Card, Opposite Page 65

## RADIAL FIXTURE DESIGN



### contributes to HIGH OUTPUT BROACHING the *American* way

While this American vertical pull-down broaching machine is broaching the inside diameter of four shock absorber yokes, the operator loads the opposite four radial stations of a rotating base fixture. At the end of the broaching stroke, the fixture indexes 90° and automatically ejects the parts down a chute. Fixture then rotates another 90° for loading while the second broaching cycle is begun.

Operation is push-button controlled — output over 1100 pieces per hour.

Unusual tooling to meet specialized production requirements is constantly being developed through creative engineering at American. Whether your broaching problem requires the best in automatic or automated control, or simply an economical adaptation of a standard machine, you will gain by referring your requirements to American. American has been making broaches, fixtures and broaching machines — all three — for over 35 years. To put this experience to work for you, send a blue print or sample part. An American recommendation will be furnished promptly.

Ask for Catalog No. 450.



**American** BROACH & MACHINE CO.  
A DIVISION OF SUNSTRAND MACHINE TOOL CO.

ANN ARBOR, MICHIGAN

See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

Circle No. 290 on Card, Opposite Page 65

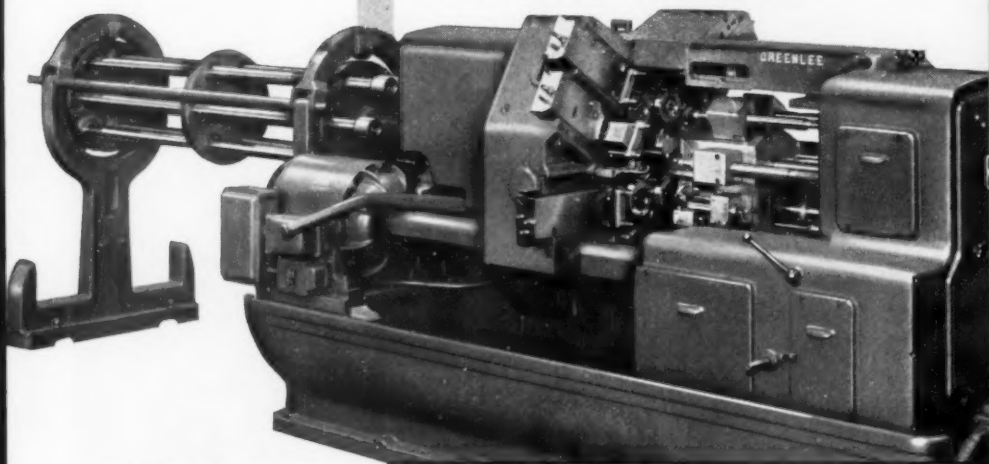




## AUTOMATIC BAR MACHINES

INCREASE YOUR PRODUCTION . . .  
LOWER YOUR COSTS!

CUT YOUR SET-UP TIME  
SPEED-UP DIFFICULT OPERATIONS



**GREENLEE  
6-SPINDLE AUTOMATIC**

### GREENLEE 6-SPINDLE AUTOMATICS SPECIFICATIONS

Rating	1"	1-5/8"	2"
Chuck Capacity, Round . . . .	1"	1-5/8"	2"
Chuck Capacity, Hexagon . .	7/8"	1-13/32"	1-3/4"
Chuck Capacity, Square . . .	3/4"	1-1/8"	1-7/16"
Stock Feed . . . . .	6-3/16"	8-5/16"	8-5/16"
Turning Length . . . . .	6"	7-1/2"	7-1/2"
Spindle Speed Range . . . . .	225 to 2500	105 to 2175	95 to 1935
Feed Range per Spindle Rev. .	.0014 to .0218	.0017 to .0388	.0019 to .043
Motor Horsepower . . . . .	15	20	25
R. P. M. . . . .	1800	1800	1800
Floor space:			
Length with Stock Reel . . .	17'-6"	17'-3"	17'-3"
Width . . . . .	5'-0"	5'-4"	5'-4"
Height . . . . .	4'-11"	5'-4"	5'-4"
Net Weight in Pounds . . . . .	14,400	17,940	18,150

### GREENLEE 2ND OPERATION AUTOMATIC

Extremely versatile, high-production machines. Parts can be loaded semi-automatically or fully automatically. Incorporates the same basic features . . . inherent production and operating advantages as the standard 6-Spindle Automatics.

Investigate  
Now . . .  
Phone  
Rockford 3-4881



**GREENLEE BROS. & CO.**  
1836 MASON AVENUE  
ROCKFORD, ILLINOIS



## The stainless you need is here

2221 sizes, shapes, finishes and types actually in stock

Here, in the world's largest stainless stocks, the exact steel you need is ready for immediate shipment—in any quantity. That's because Ryerson carries more tonnage in more types, shapes and sizes than any other source. Many requirements are available only at Ryerson. And, all Ryerson stainless is time-tested Allegheny Metal, the quality stainless you can depend upon.

Here experienced steelmen who know your industry's requirements are ready to work with you. And unexcelled specialized facilities are at your disposal for sawing, shearing, flame-

cutting or otherwise preparing stainless to your exact specification.

So far every stainless requirement—and for every kind of carbon and alloy steel as well—call Ryerson for quick, dependable service.

**NOTE ON D. O. RATINGS**—When your stainless requirements are covered by a D. O. rating, please be sure to extend it on your order to Ryerson. This will help assure future availability of nickel bearing stainless from stock.

*Principal products: Bars, structurals, plates, sheets and tubing, alloys, stainless, reinforcing steel, machinery & tools, etc.*

## RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI • CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Circle No. 292 on Card, Opposite Page 65



Presenting the first prize in BLUE BOOK's 50th Anniversary contest. From left to right: E. M. Rogert, V.P. and R. H. Wright, President, both of Guarantee Specialty Mfg. Co.; V. C. Hogren, Executive V.P. and W. F. Schleicher, V.P. and Editorial Director, both of Hitchcock Publishing Co.; Ernest J. Urbas and L. S. Speed, Plant Supt., Guarantee Specialty Mfg. Co.; Ralph Helfrick, Cleveland Representative, Hitchcock Publishing Co.

## Announce Winners

*of Blue Book's \$2500.00  
50th Anniversary Contest*

● Several factors combined to delay the announcement of the recent contest winners. For one thing, we received more entries than we had anticipated, thus requiring a great deal more time for the judging. The

entries were of such high caliber that, with the exception of a mere dozen, each had to be studied carefully by the judges. When the winners were finally selected additional time was needed to obtain photos,

## Contest Winners

---

continued

not only of the winners but of the prize presentations.

Exactly 198 qualified entries were received from every corner of the land, from every type of industry, large and small, and were sent in by workers, foremen, engineers and managers. Many of the entries were hand written and accompanied by the crudest of sketches; however, neither the writing, length of article, nor the lack of photos influenced the judges.

There was no hurried skimming and offhand dismissal of even the smallest entry, each one was examined in detail; many were read and discussed by the judges at great length. The winners were selected by a process of elimination and the final selection of winners was by unanimous decision of the judges. Not until all the judges were agreed on each one of the nine winners was the contest officially decided.

The judges based their decision on: 1. Fundamentally good idea which, having cut costs for one manufacturer, could be used by others; 2. an exceptional piece of tooling which reduced manufacturing costs or in other ways aided in the production process; 3. a sound idea with cost saving potential.

While a number of entries described exceptional results gained from unusual tooling practices as it applied to a job unique to the

writer, and having no application for anyone else, the judges made no distinction, believing that the thinking attending the tooling could serve as a thought starter for others.

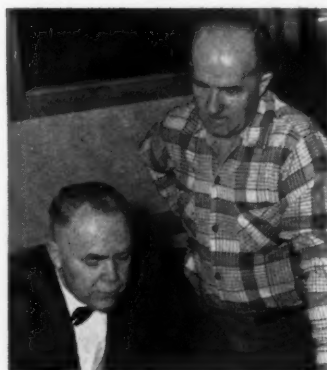
Many of the entries showed exceptional tooling and splendid mechanical thinking, unfortunately a tool could be purchased inexpensively to perform the same operation still better. The judges agreed that entries could not be considered among final winners if the spending of thousands of dollars worth of tooling and time to perform an operation could be performed by purchasing a tool for \$200 or \$300.

Most of the entries showed originality and sound machining practice. Many of them will be published in the BLUE BOOK in the months to come. For every entry used the author will be paid regular contributor's rates. Because it is difficult to determine in advance which entry will be used, and when, payment will be made on publication date.

The judges in the contest were drawn from Chicago industry and were selected on the basis of their diversified backgrounds. They were: Ed. Fluskey, Consulting Engineer to Revere Camera Co.; Paul Prikos, Vice President, Prikos & Becker Tool Co.; Ronnie Burritt, Factory Manager, J. J. Tourek Mfg. Co.; John V. Carlson, General



1st Prize  
Ernest J. Urbas



4th Prize  
A. L. Anderson, left  
and  
H. G. Pankratz, right



2nd Prize  
Eugene Harp (right)

3rd Prize  
James M. Cairney  
(below)



5th Prize  
Emil E. Sobilo



6th Prize  
Edward T. Girard



7th Prize  
C. A. Boecker



9th Prize  
E. J. Markvart



Second prize presentation was made at Boeing Airplane Co., Wichita. From left to right: Howard Buchanan, Asst. Chief Shop Load, Boeing; V. C. Hogren; Eugene Harp, Boeing; W. F. Schleicher; Neil McCormick, Factory Service Mgr., Boeing; K. W. Brown, Chief Industrial Engineer, Boeing; William Houk, Senior Supervisor Shop Load, Boeing.

Superintendent, Union Special Machine Co.; Eugene Zimney, Asst. Factory Mgr., J. J. Tourek Mfg. Co.

#### FIRST PRIZE \$1,000

Ernest J. Urbas, The Guarantee Specialty Mfg. Co., Cleveland, Ohio, for his article, "Start and End Trimming in Progressive Dies," which shows how to eliminate broken punches, chipped die blocks, eliminate waste material and in general increase the output of progressive dies without expensive

down time for die regrinding or repairs.

#### SECOND PRIZE \$500

Eugene Harp, Boeing Airplane Co., Wichita, Kansas, for his article on a modification of an Onsrud radial arm router whereby the operator, with finger tip controls, can adjust the router head to any vertical setting within the limits of the machine. Idea resulted in a net saving for Boeing of \$24,995.58.

### THIRD PRIZE \$300

James M. Cairney, Hadco Engineering Co., Huntington Park, Cal., for his article on how automation increased axle production and enabled the company to supply a better product at competitive prices. The old method consumed 112 minutes of machine cycling time as against 12 minutes for the new.

### FOURTH PRIZE \$200

A. L. Anderson and H. G. Pankratz, Bryant Chucking Grinder Co., Springfield, Vt., for their article on loading ball bearings in a cage or retainer. The old method required 31 minutes to load the cage, the new method (a mechanical loading device) requires less than a minute.

### FIFTH PRIZE \$100

Emil E. Sobilo, American Steel Foundries, Hammond, Ind., for his article on how his shop was converted to carbide tooling, the savings attained, as well as production advantages gained.

### SIXTH PRIZE \$100

Edward T. Girard, Hoover Co., North Canton, Ohio, for his article on the tooling for and the production of filler tubes. The savings which attended the change over in method amounted to \$24,605 for one year.

### SEVENTH PRIZE \$100

C. A. Boecker, American Eng. Co., Philadelphia, Penna., for his article on cutting teeth in a 14'-6" P.D. gear. The job showed splendid tooling and a great deal of efficiency with use of a planer for the cutting operation.

### EIGHTH PRIZE \$100

Robert J. Klubertanz, Kearney & Trecker Corp., West Allis, Wis., for his article describing the production method and tooling used in producing parts for a special milling machine. New method improved production 100%.

### NINTH PRIZE \$100

Edwin J. Markvart, Rockford Metal Products Co., Rockford, Ill., for his article describing tests run with various types of coolants to increase tool life. Proper selection of coolant cut tool costs in half, eliminated down time and reduced trouble at subsequent operations by 75%.

The winners' articles will appear in subsequent issues of the BLUE BOOK.

The editors wish to thank the many readers who sent in their entries and helped to make this 50th Anniversary Birthday Party a success. We regret everyone did not win.

#### **Governor Lausche Sends Telegram to First Prize Winner**

"PERSONALLY AND OFFICIALLY AS GOVERNOR OF OHIO I AM PLEASED TO EXTEND CONGRATULATIONS AND BEST WISHES TO MY FELLOW TOWNSMAN MR. ERNEST J. URBAS UPON THIS SIGNIFICANT OCCASION. HIS SUCCESSFUL ENDEAVORS IN HIS FIELD OF TOOL DESIGN ARE IMPORTANT CONTRIBUTIONS TO THE INDUSTRY."

FRANK J. LAUSCHE



**SINGLE PAIR OF HANDLES** presented a serious hazard because each operator has one free hand which could be caught in press through carelessness.

**1. A serious hazard:  
Operators have one  
hand free . . .**



**2. Safety committee ponders a solution . . .**

**IMPROMPTU SAFETY COMMITTEE MEETING** held to correct hazardous condition consists of the manager of research and development, the general foreman, works manager and personnel director who is safety committee chairman.

## Case Study of a

# Safety Plan in Action

- ▶ How the Presteel safety program works
- ▶ How it radiates from top management to every unit in the company
- ▶ How the safety committee functions

By **Leonard C. Schmidt**  
Works Manager  
Worcester Pressed Steel Co.  
Worcester, Massachusetts

- A working slogan at Worcester Pressed Steel Company, Worcester, Mass. is "Production Yes! But Safety First."

Safety at Presteel is a prime responsibility of top management—and the safety policy is directed by the President and General Manager, Carter C. Higgins. To put the policy and the slogan into actual operation, management, supervisory personnel and production workers have joined into a plant Safety Committee.

Presteel, being primarily a stamping company, has a large number of hydraulic and mechanical presses, light drills, miscellaneous tool room and rolling mill equipment, as well as welding, annealing and metal handling equipment. Typical accidents in the stamping industry result in eye and toe injuries, burns,

dermatitis, contusions, lacerations, amputations.

As policy is decided by top management, it is directed through the Works Manager, Leonard C. Schmidt, and the Personnel Director, Benjamin M. Pacek. The Works Manager redirects policy to all foremen, supervisors and production employees. The Personnel Director does liaison follow-up work, and is the management representative and chairman of the Safety Committee.

***The Safety Committee is composed of 14 departmental representatives.***

Some of these are foremen, others are production employees.

The company's industrial nurse, who also gathers all information in hospital records regarding personnel accidents and history and treatment of plant accident cases, serves as secretary of the committee. The Plant Engineering department, with one seat on the committee, serves



OPERATION IS NOW PROPERLY SAFEGUARDED. Operators are back in production after delay of only three hours. Notice both hands must be on handles.

## ***Safety Plan***

continued

to see that all present and new equipment is analyzed from a safety standpoint. Before each meeting the insurance company representative tours the plant.

Members of the Safety Committee are continually on the alert to recognize, inspect and make recommendations for eliminating sources of accidents or hazardous situations. The committee meets on a regular monthly basis, during working

**3. Result: Two handles  
are now required to trip  
the press**

hours, to compare notes and to prepare information for general dissemination.

Shop employees who have recently been injured or involved in an accident are invited to attend the Safety Committee meetings, and to describe the circumstances of the accident. Many outside experts are invited to attend the meetings, where films, slides and other devices are used for training purposes.

***Indoctrination of new employees in Presteel safety begins at the time they are hired.***

The new employees are acquainted with the company's safety policy, records, rules and program. They are given safety booklets, and are introduced to the shop hospital staff, in addition to being shown around the plant to familiarize them with their new surroundings. Each employee is given a complete physical check-up, and each is supplied with goggles and gloves, as required for his particular job. Special safety shoes are made available to the new employees at cost.

***Management insists that all shop foremen, supervisors and assistant foreman thoroughly familiarize themselves with the company's safety policy, rules and procedure.***

Job evaluation and job write-ups of all Presteel foremen state that they are responsible for safety in their departments. As supervisors of safety, they have full authority to discipline any of their employees breaking safety rules.

In addition to the work of the committee and the department foremen, a regular monthly inspection and plant tour is made by the company's insurance carrier. This safety inspection tour takes several hours, and the insurance agent is accompanied by a member of the Safety Committee. A careful look is taken at all employees, equipment and the methods of handling machinery and material. A complete report of the inspection, which also includes plant housekeeping, is made to the

committee at its monthly meeting. Action taken at this meeting is then forwarded, via the minutes, to top management. If further action is necessary, it is taken on this level.

***In the case of an accident at Presteel, a definite course of action has been outlined.***

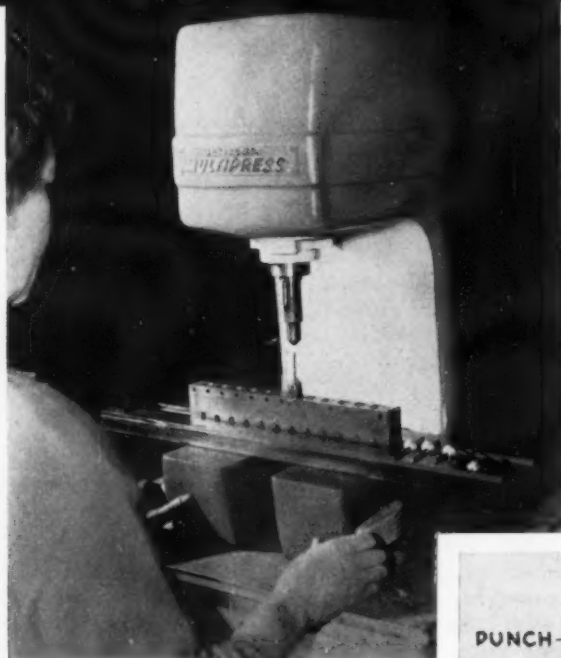
Employees are directed to report all injuries, minor or otherwise, to the shop hospital. Here minor injuries are treated and first aid given. Those suffering more serious injuries are treated in the shop hospital by a visiting doctor, retained by the company, and are then moved to a nearby private hospital.

All accidents are studied through on the spot analysis and committee research and discussion. Employees are encouraged to report even "near miss" accidents, so that the committee may take action.

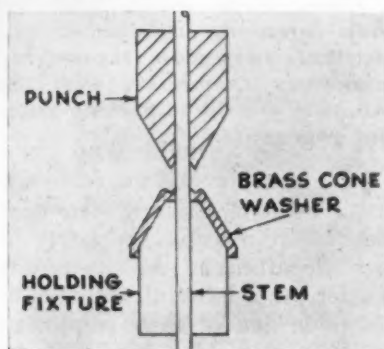
Experiments in various types of mechanical, photo-electric and pneumatic press safety guards have been made to eliminate the dangers found on the more than 125 presses in use at Presteel.

***Experiments are still going on to find better and more practical press safety guard applications.***

Insofar as possible and practical, all presses in the plant are equipped with safety guards and are two-air-valve-operated. Air ejectors, barrier guards, time, chute and slide feeds, double sweep guards and ram lock devices of various types are in use in the plant to assist in safety. •



METHOD OF ASSEMBLING a brass cone washer and a steel rod valve stem is accomplished by new one-ton Multipress. Washer is positioned on fixture, stem is inserted, and the two pieces merged to a swaged fit by a dual push button actuated ram. Diagram of the operation shown below.



## 1-Ton Hydraulic Press

... solves small parts assembly job

By **George Hansman**  
President  
Triad Metal Products Co.  
Cleveland, Ohio

• A unique method of assembling a brass cone washer and a steel rod valve stem is accomplished on the

new one-ton Multipress in one simplified operation at the Triad Metal Products Company, Cleveland.

The job consists of positioning the cone washer on a fixture of a slide feed work holder. A steel rod stem is then inserted into the wash-



FINISHED ASSEMBLY of brass cone washer and valve stem.

er and the two pieces merged to a swaged fit by the action of the ram.

The ram is lowered in one smooth movement, at one-ton pressure and with a 1-1/2 inch stroke. The ram is actuated by the operator pressing the two buttons positioned at the side of the press simultaneously. The electrical control circuit of the press eliminates the possibility of injury as the unit can be operated only when both hands are on the actuating buttons. One unskilled worker can operate the unit.

In manufacturing the internal needle valves for kerosene stoves, it is essential to attain a swaged fit. Such a fit is obtained because the press allows the brass to flow into, and around the punch, thus giving the desired fit to the needle valve.

Eight hundred to 900 valves are produced each hour at Triad's plant.

Manufacturers can adapt the machine to many applications, such as, operating the machine on straight line production, operating with an electric dial table, a power screw feed hopper, a multiple unit on a dial table, or to operate by the stock feed method.

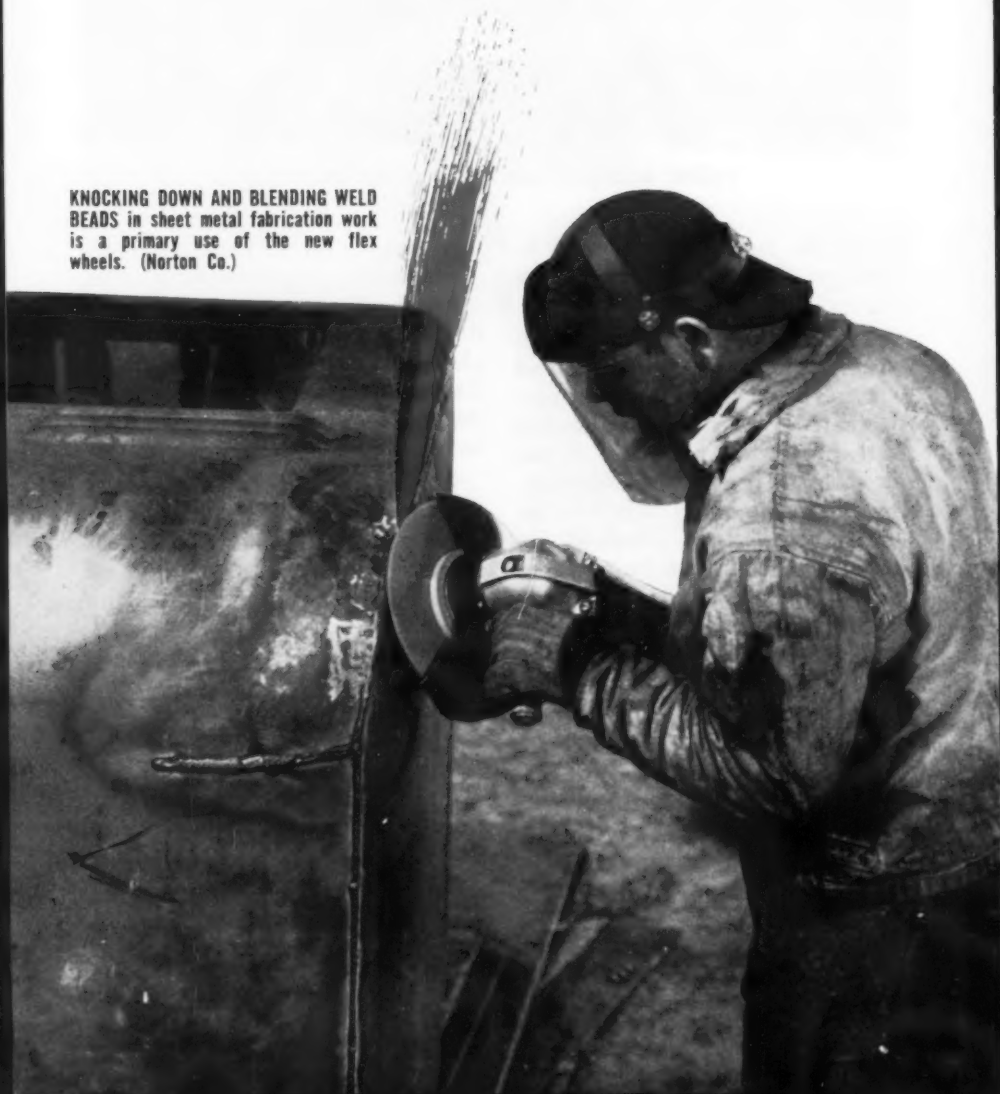
The press can be maintained by checking the lubricating oil and replacing the hydraulic oil every six months and by checking the oil level every two weeks.

The ram pressure of the new press can be quickly set from 500 to 2,000 pounds by merely releasing the cap and lock nut on the pressure regulator. The screw is tightened to increase the pressure, loosened to lower the pressure. Ram pressure is easily checked on the gauge by holding down the operating switches and opening the valve slightly when the ram is in the down position. • • •

*Here's how you can cut costs with . . .*

## **Flexible Reinforced**

**KNOCKING DOWN AND BLENDING WELD BEADS** in sheet metal fabrication work is a primary use of the new flex wheels. (Norton Co.)



# Wheels

*They cut costs because they're . . .*

- ▶ Tough
- ▶ Versatile
- ▶ Safe
- ▶ Fast cutting

By Richard C. Bush  
Assistant Editor

• Machine shops, foundries, welding departments, maintenance and other departments are discovering the high speed, and extreme versatility of the new flexible reinforced wheels.

These wheels offer the advantages of toughness, flexibility, fast cutting action, lightweight and easy manipulation in a wide range where portable grinders are used for:

- . . . removing rust and scale;
- . . . cutting down weld beads;
- . . . cutting off gates and risers of castings;
- . . . burring steel parts;
- . . . blending weld contours on all types of fabricated work;

- . . . removing mold marks on castings;
- . . . preparing casting surfaces for painting, and many other applications.

***Built-in strength and safety are the reasons for their great utility.***

They are made by impregnating cotton fabric with abrasive grain; the resulting layers are then laminated with a strong organic bond. The fabric fibers serve to reinforce the entire structure of the wheel. This results in a wheel of high tensile strength and impact resistance, and which can be operated on portable or stationary equipment with a much higher safety factor than conventional discs and wheels. Surface speeds of the flex wheels in operation, greatly exceed the permissible speeds for conventional wheels. These wheels are long wearing, and can be used right down to the arbor, shank or nut.

In portable disc-sander applications in cleaning concrete and smoothing terrazzo decking, their speed of cutting matches that of sanding discs; their useful life is much greater. In foundries where air chisels, cup shaped wheels, and sanding discs, were used in cleaning castings, flex wheels have been able to take over all three jobs, and do them faster and more economically. They have been found very successful for knocking down welds and blending them into surrounding metal, using right-angle grinders to do the job.

## New Flex Wheels

continued

These wheels haven't been limited to the portable grinder field.








*Many shops are finding them extremely useful as all purpose cutoff wheels for a wide range of materials, including BX cable, conduits, plastics, Celotex, Masonite, wire screening, and other composition materials.*

So far, uses for these wheels range all the way from finishing

fork tines to cutting masonry walls and the list is still growing.

*In cutoff demonstrations flex wheels have shown the ability to cut hardened steel right after cutting asphalt tile.*

This would be impossible with ordinary wheels because of the loading factor. Because they will cut on both sides as well as the face, they are 'useful for cutting intricate template shapes from sheet

COMPARISON OF SHOP METHODS					
JOB — TO MAKE A TEMPLATE OF COLD ROLLED STEEL AS PER SKETCH					
<u>OLD WAY</u>			<u>C F WAY</u>		
<u>OPERATION</u>		<u>TIME</u>	<u>OPERATION</u>		<u>TIME</u>
1. LAYOUT		5 MIN	1. LAYOUT		5 MIN
2. PRICK PUNCH		2 MIN	2. PLUNGE CUTS TO REMOVE EXCESS		2 MIN
3. SAW AS PER DOTTED LINES		4 MIN	3. CUT TO LINE USING EDGE AND SIDE OF WHEEL		3 MIN
4. FILE TO LINE		10 MIN			
<u>TOTAL TIME OLD WAY 21 MIN</u>			<u>TOTAL TIME 10 MIN</u>		
			<u>TIME SAVED — 11 MINUTES</u>		

IN MAKING TEMPLATES of all ordinarily used materials, the flex wheel way will cut time in half. Above is typical example. (Chicago Wheel & Mfg. Co.)

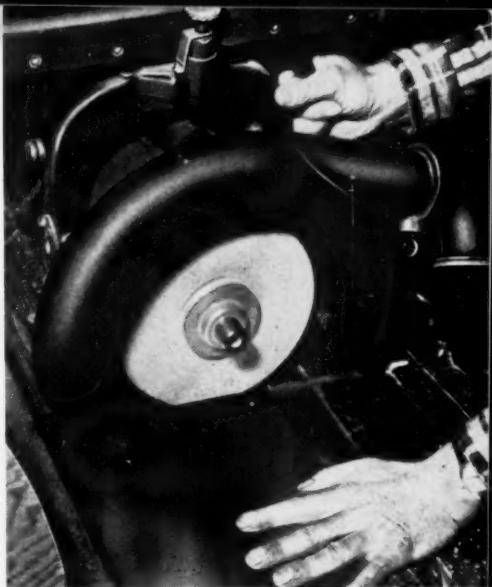
stock of all types of materials. Because they are resilient, they resist side pressures and side impacts which no ordinary straight wheel could stand.

Flex wheels come in straight and depressed-center types, and in a wide range of grit sizes. In aluminum oxide, they are offered from 16 to 320 grit, and in silicon carbide from 12 to 80 grit. Several grades ranging from soft to hard are available. Thickness of the discs and depressed center types runs from 1/16" to 3/4".

Users should realize the limitations of these wheels as well as their capabilities. They should not be used for heavy stock removal in cleaning and deburring castings.

***Safety precautions for flexible reinforced wheels are much the same as for conventional wheels.***

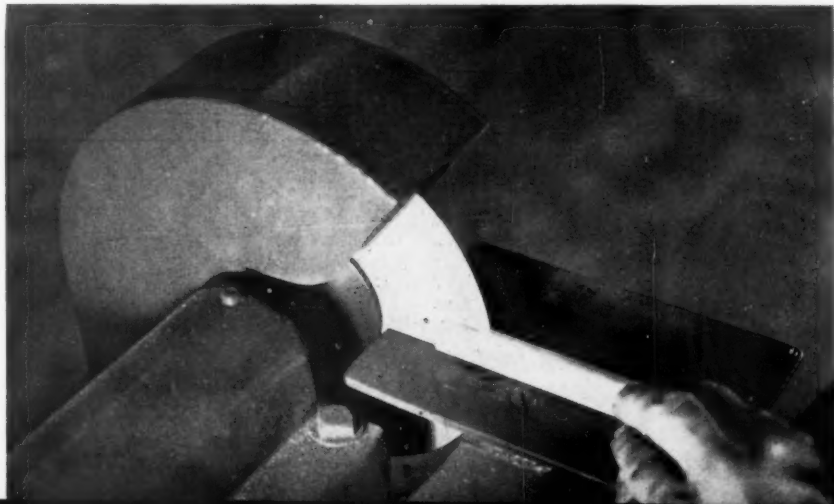
Adequate guarding is a must; even though the wheels are much safer, guards are still necessary.

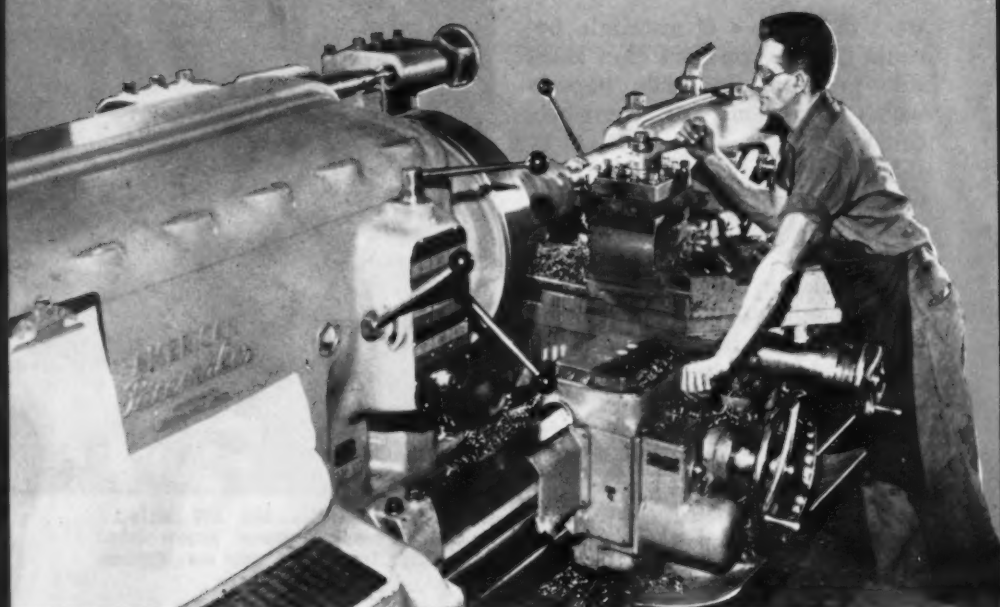


**EFFECTIVE ON PLASTIC AND NON METALLIC MATERIALS, here is a general purpose cut-off wheel cutting Transite in a radial saw. (Carborundum Co.)**

Wheel manufacturers give procedures for insuring that the wheels are running true and in balance before use. These procedures should be carefully followed for safe operation. • • •

**SLOTING TUBING, using a flex wheel on a bench grinder. (Macklin Co.)**





*Combination of tracer controlled lathe  
and proper carbide tooling . . .*

## **.. Ups Production 400%**

● Eighteen pounds of metal per minute! That's the amount of steel Improved Machinery Inc., Nashua, N.H., maker of paper and pulp processing equipment, removes in machining an important equipment component—by combining the efficiency of a tracer-controlled lathe with proper carbide tooling.

*The operation is saving the company about 14 hours per day in labor, without taking into ac-*

*count tool savings and other fringe benefits.*

In manufacturing paper and pulp processing equipment, Improved Machinery uses many types of metals. Some of the vaned rolls for pulp processing, for example, measure 193 to 219 inches in length, with diameters of 4½ to 5½ inches. They are fabricated of a combination of mild and stainless steels. Stainless is required to resist acids

employed in paper pulp processing.

An important element of the vanned rolls is the head and journal. This is machined from a single billet of mild steel with dimensions of the journal held to close tolerances. The latter subsequently is fitted with a stainless steel sleeve prior to roll assembly.

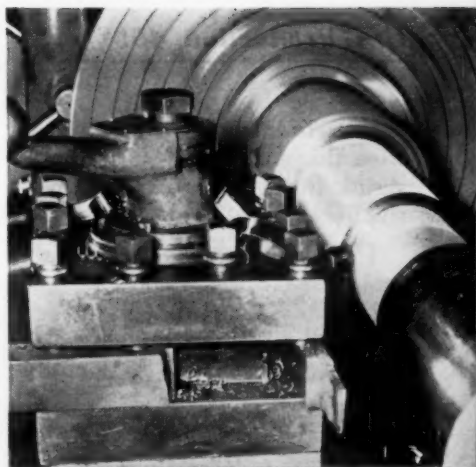
The part, which measures slightly over 22-in., formerly was machined in an engine lathe. In taking down the 7-in. dia. stock to 6 1/4-in., and machining the required steps, about 6 hours of labor were charged to the job. Only two roll components could be produced per day.

The same part now is produced in about 1 1/2 hours. The changed picture is due in part to a carbide cutting tool, and in part to the 25-inch, 40-hp, tracer-controlled American Pacemaker lathe employed.

***The carbide, Carboloy grade 370, eliminates tool changes and, in spite of the heavy cuts, machines 8 to 9 complete pieces—a day's run before requiring sharpening.***

The lathe, after initial template is made, eliminates considerable setup time and assures repetitive accuracy. Machining the template requires about a half hour, including inspection by both the operator and inspector.

The 1020 steel billet is machined by Improved Machinery at speeds between 500 to 800 fpm. At these speeds the work pulls about 50 hp from the machine. A four-step oper-



**CARBIDE CUTTING TOOL IN ACTION.** Note chip size. Work is machined between 500 and 800 fpm. Time for roughing-finishing: 30 minutes.

ation, the job calls for roughing and finishing, each sequence requiring about 1/2-hour.

Because of the terrific heat generated, and the fact the sleeve diameter is fussy, the operator makes it a practice to remove the part from the machine after roughing to allow for cooling. No coolants are used during the entire operation.

Average depths of cuts for roughing are 3/8 to 3/4-in. with a feed of 0.021-in. While finishing, the tool is fed at 0.016-in.

When completely machined, the component ends up with a 5/16-in. chamfer on the 2 1/4-in. dia. with a portion of this 5-in. length reserved for threading. The remaining 17 inches of the part winds up with about a 3-7/16-in. diameter. Criti-

## Ups Production 400%

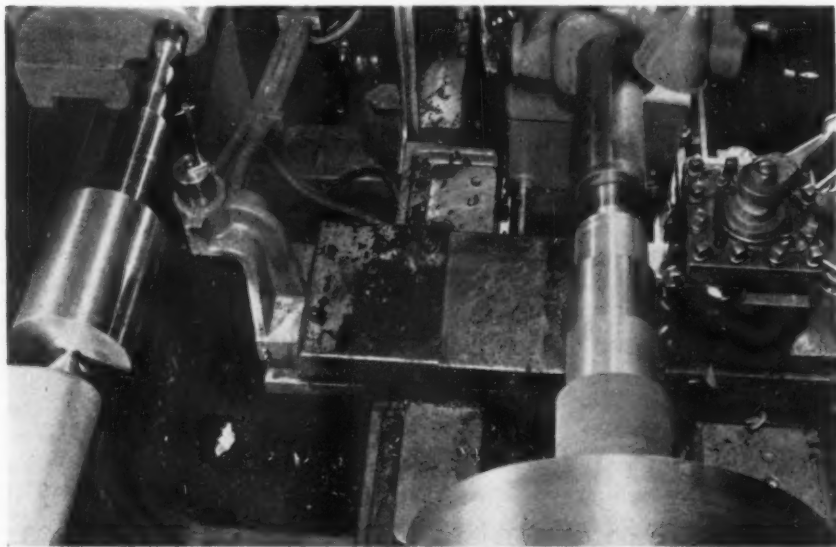
continued

cal area of the part is about 9 inches from this end which must take, by shrink fitting, a 3.5-inch diameter stainless sleeve.

The carbide tool is a left-handed tool used on its side. It includes a 1/32-in. nose radius, 7-degree side and end relief, 0-degree side cutting edge angle, and end cutting edge angle of 10 to 15 degrees with 27-degree secondary end cutting edge angle. The tool also has a 0-degree back rake and 6-degree positive side rake. The chip breaker, running parallel with the tool is about 0.125-in. wide, and 0.018-in. deep. • • •



EQUIPMENT COMPONENT produced by Improved Machinery Inc. At left, the 1020 steel billet; right: 22-inch finished part.



TEMPLATE, LEFT, CONTROLS ACTION OF TOOL in cutting steps involved. Depths of roughing cuts average  $\frac{3}{8}$  to  $\frac{3}{4}$ -inch deep.

# NOW

## CUT COST OF PRECISION GEAR PRODUCTION

5410

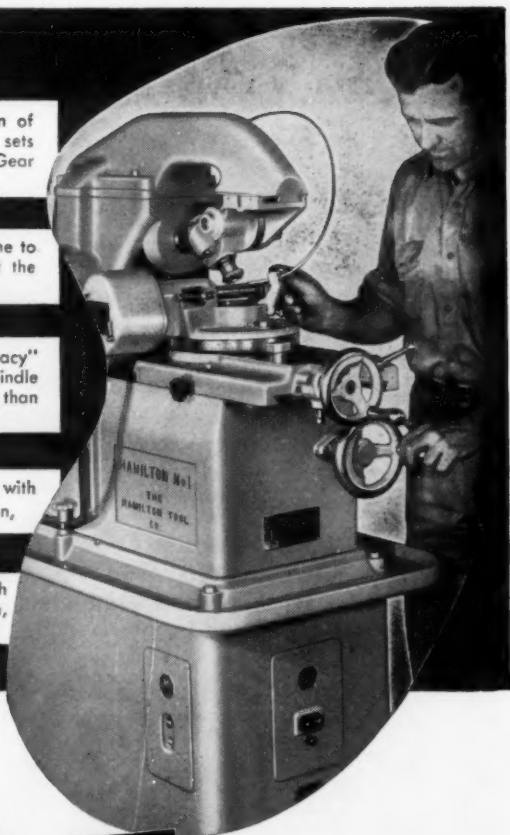
**THIS FEATURE:** "Independent selection of speed, feed and indexing," sets the Hamilton Precision Small Gear Hobber apart from the field,

**AND ENABLES** the users of this machine to vary speed and feed to suit the material being machined.

**THIS FACT,** and a "reserve of accuracy" built into the machine, work spindle and hob spindle runout of less than .0002" as an example,

**CONTRIBUTES** to more gear precision with no sacrifice of gear production,

**OR INCREASED** gear production with no sacrifice of gear precision,  
..... OR BOTH!



Prices and specifications without obligation

ASK FOR **FREE BULLETIN 5410**

Address

The Hamilton Tool Company  
826 South Ninth Street  
Hamilton, Ohio



**IT'S A**

# Hamilton Tool

USE IT WITH CONFIDENCE

# THE BLUE BOOK

*Salutes its*  
**1906 Advertisers**



No. 5 in a  
Series

By **D. M. Carlson**  
Assistant Editor

## **The D. E. Whiton Machine Company**

● The D. E. Whiton advertisement on page six of our first issue, January 1906, described chucks for heavy work . . . "Heavy chucks for severe duty, proportioned for use on modern turret lathes, and for all requirements where weight, power and durability are essential. Also a complete line of chucks for all usual requirements."

The D. E. Whiton Machine Co. was established one hundred years ago, in 1856, at West Stafford, Conn. It first manufactured center-



The Whiton Machine Co. plant under construction, 1883.

ing machines, followed soon by a line of lathe and drill chucks, and then gear cutting machines.

In 1885, the company moved to

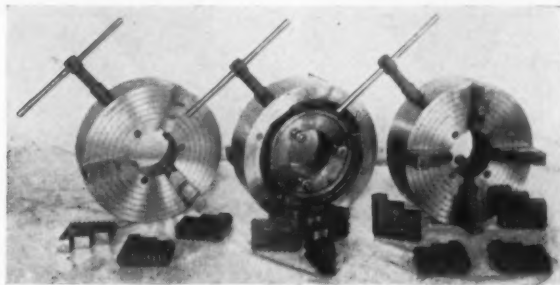


Photo used in a catalog distributed by the company in 1924. Their heavy duty chuck line has been improved many times since then; is still a leader in its field.

# PORTELVATOR®

The Handy HAMILTON Portable, Elevating Table

A  
PORTABLE  
HEIGHT-  
ADJUSTABLE  
TABLE  
•  
TRUCK  
•  
WORK BENCH

for  
DIE TRANSFER  
•  
MACHINE FEEDING  
•  
ASSEMBLY AT  
BEST HEIGHT  
IN BEST LIGHT

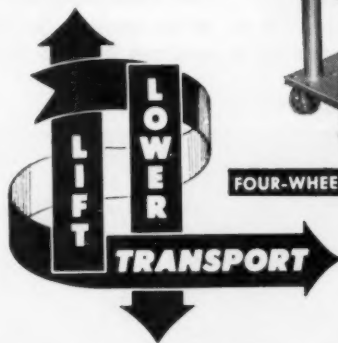
LIFTING  
•  
LOWERING  
•  
TRANSPORT  
of  
SHEETS  
PLATES  
BARS  
TUBES  
PIPES  
TOOLS  
DIES  
FIXTURES  
•  
ALL  
COMPACT HEAVY  
LOADS

**UNOBSTRUCTED  
PERIMETER**

**WORK FROM  
ANY SIDE**

**MORE SERVICE for LESS MONEY  
than  
ANY Other Unit of Equipment**

**43** table surfaces  
point support



FOUR-WHEEL and



SIX-WHEEL MODELS

Recent changes and additions to the line provide greater capacities, new flexibility, many bonus features.

**Write for NEW, FREE Bulletin P-5604**

Address THE HAMILTON TOOL COMPANY,  
826 South Ninth Street, Hamilton, Ohio



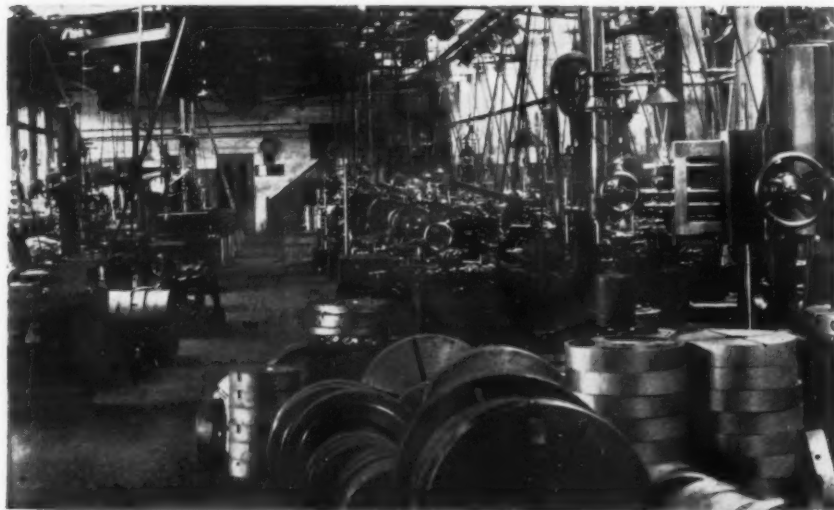
**IT'S A**  
**Hamilton Tool**  
USE IT WITH CONFIDENCE

5604



Lucius E. Whiton, 1912, at the age of 50 yrs. He was famous for his desk piled high with papers. When it became too cluttered for even him, he would move to another desk.

Main floor of D. E. Whiton shop about 1912.

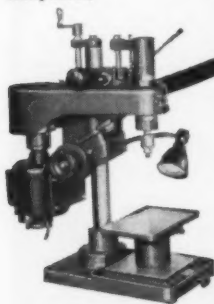


# precision product?

**EXACT  
HOLES ARE  
IMPERATIVE!**



**HAMILTON VARIMATIC®**  
Super Sensitive  
Variable Speed  
Small Hole  
Precision  
Drilling Machine



Are you fighting the never-ending battle of trying to produce exact holes on a drilling machine which, itself, is not built to precision tolerances? You are under no necessity to do so. For the difference in price between the cheapest bench type, small hole drilling machine and the Hamilton Varimatic is reckoned in pennies per day. And the Hamilton Varimatic (holes from .004" to 1/4" in all drillable materials) is super sensitive. Provides speeds, infinitely variable, between 840 R.P.M. and 9300 R.P.M. Is built to precision tolerances, and with the stamina to retain precision.

Get prices and specifications without obligation

ASK FOR **FREE** BULLETIN 5408

Address The Hamilton Tool Company  
826 South Ninth Street  
Hamilton, Ohio



**IT'S A**  
**Hamilton Tool**  
USE IT WITH CONFIDENCE

Circle No. 295 on Card, Opposite Page 65

New London, Conn. For many years, it was among the largest manufacturers of chucks and machine tools.

Manufacture of steam turbines was introduced around 1911. The machine tool enterprise has been

discontinued, but the company is still well known for its manual and power operated chucks and has introduced many improvements in this field in recent years, as well as in the design and operation of its steam turbines.

## **Bignall & Keeler Manufacturing Company**

• In a small St. Louis shop in the year 1877, the first of a great line of pipe threading machines was built. The designs, the patterns and the construction of this machine were under the supervision of M. C. Bignall, and the machine was the foundation of the Bignall & Keeler

line. Several years later, controlling interest was purchased by N. O. Nelson.

Bignall's early associates co-operated with him in building threading machines up to the 4" size, but insisted that the larger pipe could be threaded to better ad-

These solemn gentlemen were photographed in the offices of the Bignall & Keeler Machine Works, Edwardsville, Ill. Circa 1912.



**You buy Scully-Jones**  
**"PREMIUM FEATURE"**  
**FLOATING HOLDERS**  
**AT NO PREMIUM**  
**IN PRICE!**

These benefits . . .	for these reasons . . .	result from these PREMIUM features
<b>HIGHER QUALITY WORK</b>	No "binding" or dead spots to cause ball-mouthed, out-of-round, or poorly finished reamed holes. No oversized or tapered threads when tapping.	1. Exclusive double-gear spline drive provides a balanced, constant velocity, and a flexible drive coupling which permits freedom of lateral or angular movement.
<b>LOWER CUTTING TOOL COSTS</b>	No "cramping" to break fine cutting edges.	2. Two thrust bearings placed close together and independent of drive, as well as proper clearance in the spline, allow tool to float freely and quickly into proper alignment.
<b>INCREASED PRODUCTION</b>	Less downtime due to cutting tool breakage.	3. New Lock-and-Eject Type Chuck (Style "JT" only) eliminates need for conventional-type drift.
<b>LOWER MAINTENANCE COSTS</b>	Positive, self-lubricating action practically eliminates wear.	4. "Rocking" action with spline drive coupling causes continuous flow of lubricant in and out of splines, and cushions drive against torsional shock and overload. Shell houses floating and driving elements, and acts as perfect seal for lubricant.
<b>LOWER TOOLING COSTS</b>	Holder may be used for most class-center and multiple-spindle operations.	5. Small body diameter.
	Requires little space between spindle and work.	6. Minimum body projection (Style "JT" and "JS").

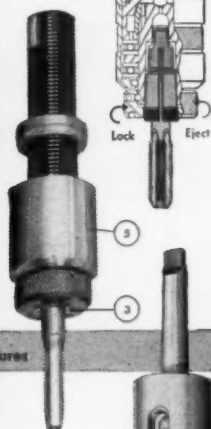


Call your Scully-Jones factory-trained representative or distributor for complete information and prices.

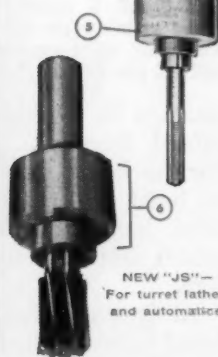
**PRECISION HOLDING TOOLS**  
*"Precision Holding" for holding precision*

Scully-Jones and Company, 1907 South Rockwell Street, Chicago 9, Illinois

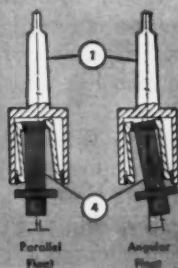
NEW "JT"—  
Lock-and-Eject  
Collet Type



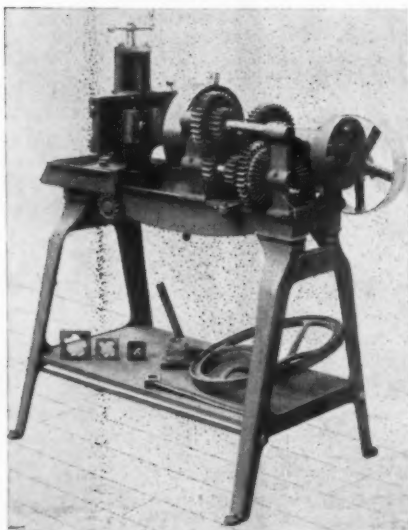
STYLE "JA"



NEW "JS"—  
For turret lathes  
and automatics



Circle No. 296 on Card, Opposite Page 65



This Bignall & Keeler "Little Peerless" was lauded as being "the best solid die machine on the market, giving excellent satisfaction in both bolt and pipe threading."

vantage on a lathe. Bignall maintained there was a real demand for the larger sizes and continued to build larger machines until, in 1882, he was producing machines which would handle pipe of 12" size.

At first all gears, whether spur, bevel or worm, had cast teeth, but in 1883 a Brainard gear cutter was secured and all except the large master gears and pinions were cut from solid blanks. In 1887 the swinging type of die head with Peerless expanding dies gave way to an improved head which brought the dies close to the gripping chuck for threading short pipe.

The demand for more rapid operation in pipe threading work

led to the development of the "P.D.Q.C." machines in 1888, having lever operated chuck and provision for changing pipe while machine was running.

In 1892 the Bignall & Keeler Machine Works of the N. O. Nelson Mfg. Co. moved to Edwardsville, Illinois. The company was operated on the profit-sharing plan.

As soon as electric power became popular, individual electric motors were mounted on each machine, replacing direct-connected steam engines. New heads with improved cut-off and reaming tools were put on the market in 1904, and in 1907 a gear box arrangement was perfected which provided for all speed changes through steel gears running in oil.

The company is now the Bignall & Keeler division of the John Ramming Machine Company, and is located at St. Louis, Mo. • • •



# **SANFORD** BENCH SURFACE GRINDER MODEL SG

**for Wet\* or Dry Grinding!**

**PRECISION • SPEED • SENSITIVITY**

A low cost, precision machine for surface grinding dies, instrument parts, gauges and other small parts which would fit in the palm of the hand.

By using Sanford Bench Grinders many manufacturers of precision machinery have drastically cut over-all costs for finishing small intricate parts. This releases large, more expensive machines for heavier duty work.

The Sanford SG is the only low cost Bench Surface Grinder that

- Grinds to less than .0001" tolerances
- Operates without vibration
- Assures long life because Meehanite castings are used in its construction

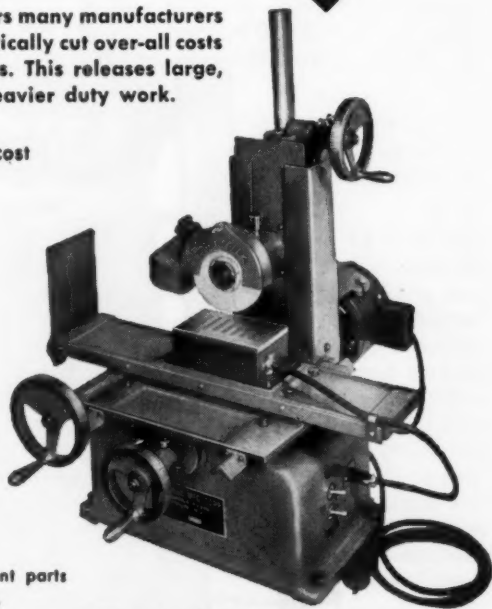
**SPECIFICATIONS**—4" traverse  
—8" longitudinal—6" vertical  
under 4" wheel; Approximate  
weight 160 lbs.

Complete details are included  
in illustrated bulletin.

Send for your copy today.

Reconditioning facilities, replacement parts  
and special attachments are available.

Send for price list.



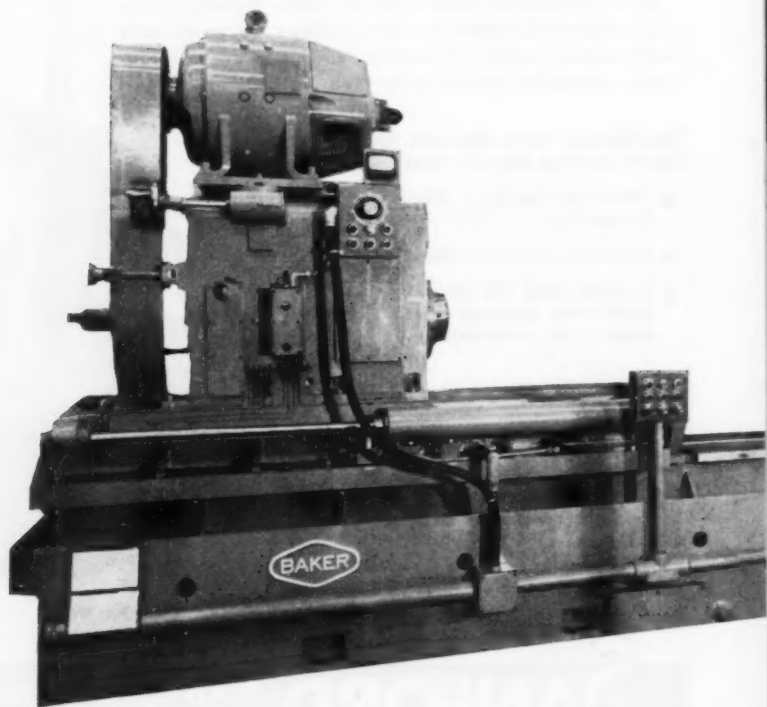
\*With optional equipment

**SANFORD** MANUFACTURING CORP.  
1026 Commerce Ave., Union, N. J.

**HOW**

## **Douglas Solved Its Deep**

- ✓ Tables show ratio of hole diameter to depth . . . finishing and diameter tolerances . . . feeds, speeds
- ✓ Use gun drill without coolant in vertical position
- ✓ Machines used include: deep hole drilling . . . engine lathe . . . turret lathe . . . radial drill



**FIG. 1—DEEP HOLE DRILLING MACHINE (Baker) used by Douglas Aircraft with gun drills.**

# Hole Drilling Problems

By **A. R. Felando**, Tool Research Analyst  
Methods Development Group  
Torrance Facility  
Douglas Aircraft Co.  
El Segundo Division

● The machining of deep holes presents considerable difficulties when using conventional tools. It has generally been accomplished by drilling a pilot hole through which a succession of larger drills was then used. These were followed by boring operations.

riety of deep holes that have nothing to do with gun barrels. Foremost in the innovations is the carbide tipping that has speeded metal removal.

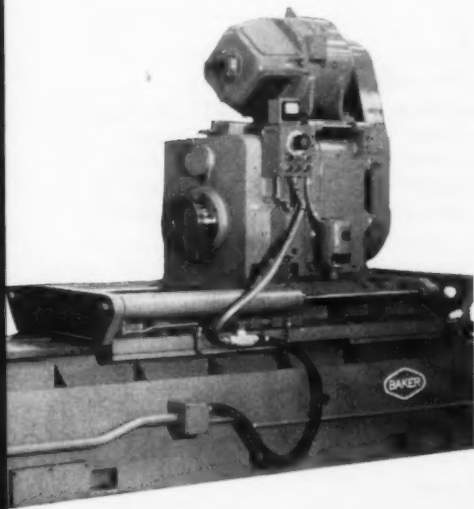
To properly evaluate the method for use in the increasing size of components in Navy aircraft a study was made and recommendations set up for gun drilling operations. Some of these recommendations applied to all gun drill operations while others are specific to one type.

These general recommendations call for the use of gun drills where the ratio of the hole diameter to the depth is as follows:

1/4" to 1/2" dia.	12 times dia. and deeper
Over 1/2" to 1" dia.	7 times dia. and deeper
Over 1" to 1 1/2" dia.	5 1/2 times dia. and deeper
Over 1 1/2" to 2" dia.	4 1/2 times dia. and deeper
Over 2" to 2 1/2" dia.	4 times dia. and deeper
Over 2 1/2" to 3" dia.	3 1/2 times dia. and deeper
Over 3" to 3 1/2" dia.	3 times dia. and deeper

Where required alignment, concentricity, hole diameter, tolerance, and finish can be accomplished in one operation with a gun drill, but cannot with a twist drill.

Recent improvements in construction of gun drills have made them worthy of consideration for a va-



## Deep Hole Drilling

continued

TABLE 1

Use gun drills when runout tolerances can be met by the values listed below:

Hole Diameter	Dural	Steel Under 140000 psi	Steel 140000 to 200000 psi	431 CR Steel Under 145000 psi
1/4" to 1/2"	.001"	.0015"	.0015"	.0015"
1/2" to 1"	.001"	.002"	.002"	.002"
1" to 2"	.002"	.0025"	.003"	.003"
2" to 3 1/2"	.003"	.003"	.0035"	.0035"

TABLE 2

Finishes Available with Gun Drills

Dural .....	10-40 micro inches
Steel under 140000 psi .....	60-80 micro inches
Steel from 145000 to 200000 psi .....	80-125 micro inches
431 CR Steel under 145000 psi .....	40-80 micro inches

TABLE 3

Diameter Tolerances Available with Gun Drills

Drill Diameter	Dural	Soft Steel	HT Steel	431 Stainless
.250"—.500"	+.0005"	+.0005"	+.001"	+.001"
.500"—1.000"	+.001"	+.0015"	+.001"	+.001"
1.000"—2.000"	+.0015"	+.002"	+.0015"	+.0015"
2.000"—3.500"	+.0015"	+.0025"	+.002"	+.002"

TABLE 4

Suggested Starting Speeds

	Ferrous Materials	Common Brass and Bronzes	Aluminum Alloys
Peripheral speed	150—350 SFM	Up to 500 SFM	Up to 600 SFM

TABLE 5

Suggested Feeds

Drill Diameter Inches	Feed in Inches per Revolution	
	Carbide Tipped Drills	High Speed Steel Drills
5/16—1-7/16	.0005—.0015	.0007—.002
1-1/2—2-1/2	.001—.003	.0015—.003
2-5/8—4-1/2	.002—.006	

## The type of gun drill generally used is the target type with coolant

Special considerations were recommended for the evaluation of each job. Each must be considered as an individual case and trial and error must often be employed to determine optimum feeds and speeds. Hole size, material, etc., dictate the power required for drilling.

Five drills were considered: 1. Target gun drill (registered trade mark of National Twist Drill and Tool Co.) with carbide tip and no coolant. 2. Target gun drill with carbide tip and coolant. 3. High speed steel center cut gun drill with no coolant. 4. High speed steel center cut drill with coolant. 5. Center cut drill with carbide tips and coolant.

The type of gun drill generally used is the target type with coolant. It can be used in either the vertical or horizontal position when adequate cooling provisions are made. Holes have been drilled in production runs up to 32" deep with a maximum runout of but .002". Finishes of 3-10 micro inches in Dural and 30-80 micro inches in steel have been obtained.

***A high speed steel center cut gun drill without coolant can be used in a vertical position when the material does not exceed .375" in thickness.***

This limitation is made because the ejection of chips is blocked by the guide bushing when greater thicknesses are drilled. With such drills in a horizontal position, holes up to .375" diameter have been held to plus .002" and minus .000". Finishes as low as 40 micro inches are obtained in Dural.

The high speed steel center cut drill used with coolant operates satisfactorily in either vertical or horizontal position when special adaptations provide proper coolant supply. Holes up to 1/2" in diameter are held to plus .001" minus .000" and finishes of 15-20 micro inches are standard in Dural.

The center cut drill with carbide tips require the same coolant provision as above. Because the area at the center of the tool is at zero surface speed the life of the carbide inserts is shortened unless pilot holes precede their use. Holes up to 3" diameter are held to plus .002", minus .000" and finishes of 15-20 micro inches are standard.

All five tools discussed above were used with guide bushings. Bushings are placed as close to the work as possible, when pressurized coolant is used, without impairing the ejection of the chips (horizontal position). The bearing clearance

## Deep Hole Drilling

continued

between the bushing and the drill diameter must not exceed .0005" when using drills of 1" and under. For drills over 1" this clearance should not exceed .001.

The following machines have been used with gun drills:

Baker Deep Hole Drilling Machine, Fig. 1.

Monarch 20" Engine Lathe, Fig. 2.

Warner and Swasey Model 3 Turret Lathe, Fig. 3.

Cincinnati Radial Arm Drill Press, Fig. 4.

It was not necessary to adapt the Baker Deep Hole Gun Drilling Machine nor the Cincinnati Radial Arm Drill Press. The adaptation of the other two machines included provision for guide bushings and pressurized coolant supply. The guide bushings have been discussed previously in this report.

Coolant may be applied to the work in either a fog form or in a steady stream. The individual jobs

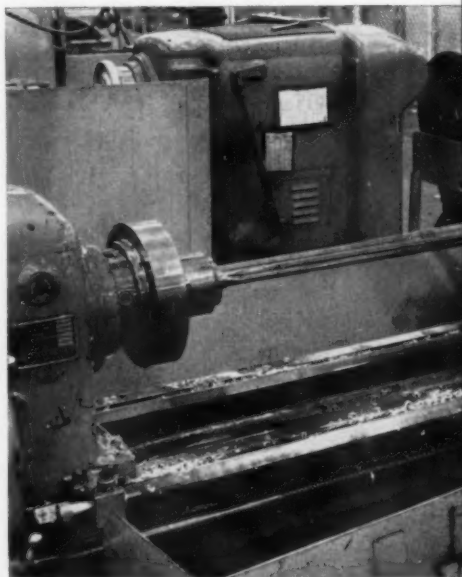
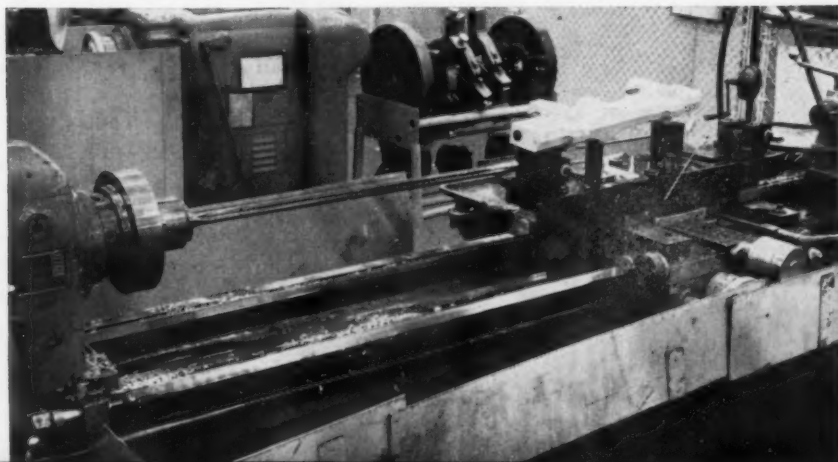


FIG. 2—PART IS IN PLACE on Monarch lathe.

FIG. 2A—HOLE HAS BEEN DRILLED on lathe.



will dictate which form is more advantageous.

When the coolant is to be applied as a spray and when the gun drill has a coolant passage, the coolant is used in conjunction with an air

pressure source. The coolant and air are mixed in a connector joint which is coupled to an adapter on the spindle of the machine. This mixture flows through the adapter and into the drill body, spraying upon the work at the cutting surface. When using a gun drill having no coolant passage, the fog is sprayed upon the work through a flexible tubing.

Coolant applied as a stream is pumped from a tank through the machine, drill body, and coolant passage to the drill point, or is played upon the work through a flexible tubing when no coolant passage is provided.

Equipment for each of the above coolant supply methods is available in this plant.

The Baker Deep Hole Drilling Machine is designed specifically for use with gun drills. The 20" Monarch Lathe adaptation allows the machine to be used for deep hole drilling as well as for conventional lathe operations.

Examples of actual jobs follow:

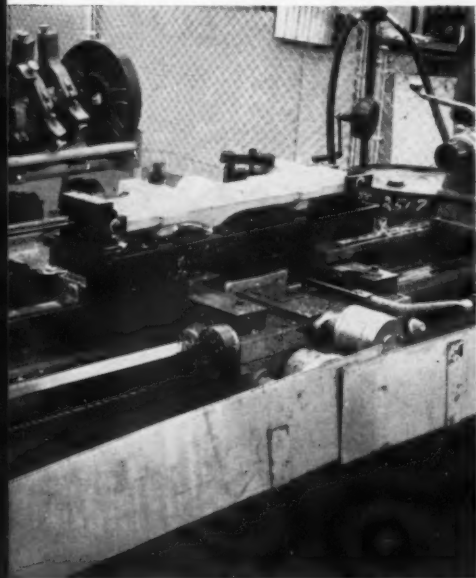
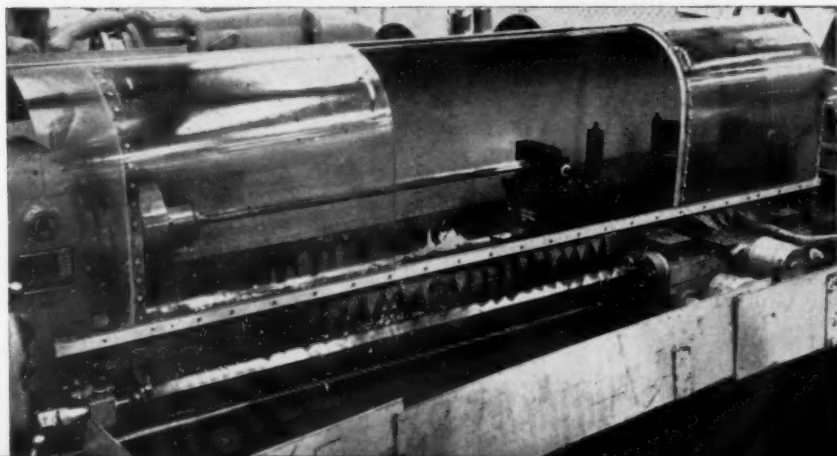
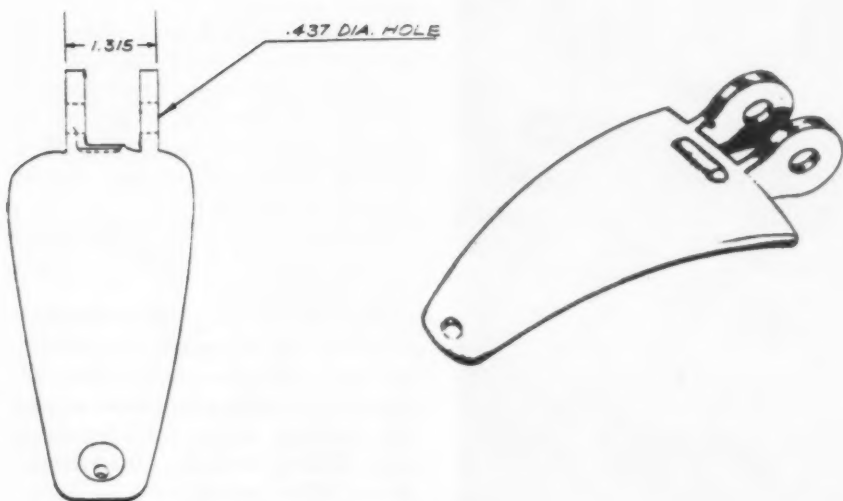


FIG. 2B—SAFETY SHIELD is in place on lathe.



### *Examples of gun drilling jobs at Douglas Aircraft*



SKETCH 1—DRILL PRESS APPLICATION on a 4 Hook Rack

MATERIAL: HY-TUF STEEL, 220,000 - 240,000 psi

Some three hundred of these parts were heat treated and then sent to be drilled on a drill press. The heat treating rendered the steel very hard, and the conventional high speed steel drills would not cut the material. The Methods Development group investigated the situation and decided to attempt the Gun Drilling Method.

The drill press was adapted to provide suitable coolant for the operation. The Gun Drill operation proved very successful. Tolerances on the holes were held to specifications and scrap was kept to a minimum. The gun drills used in this particular application were of the target type with carbide inserts.

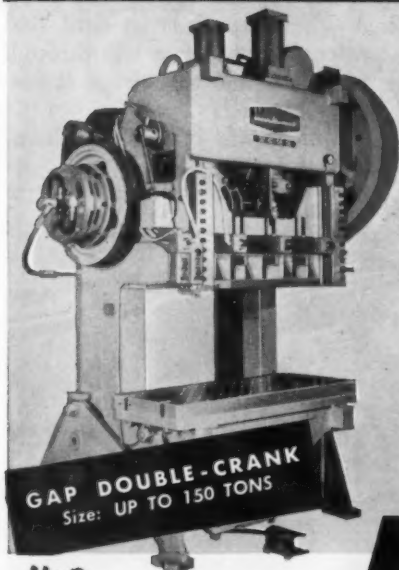
# JOHNSON

INTRODUCES

## TWO NEW SERIES of PRESSES



**STRAIGHT SIDE DOUBLE-  
CRANK and SINGLE-CRANK**  
Size: UP TO 125 TONS



**GAP DOUBLE-CRANK**  
Size: UP TO 150 TONS

**Also 22 MODELS OF OBI  
MECHANICAL PRESSES**  
from 16 to 125 Tons Capacity

- Box Type Ram
- Steel Fabricated
- Air Clutch (low inertia)
- Electrical Controls
- Bronze Gibs and Ball Seat
- Air Counter Balance

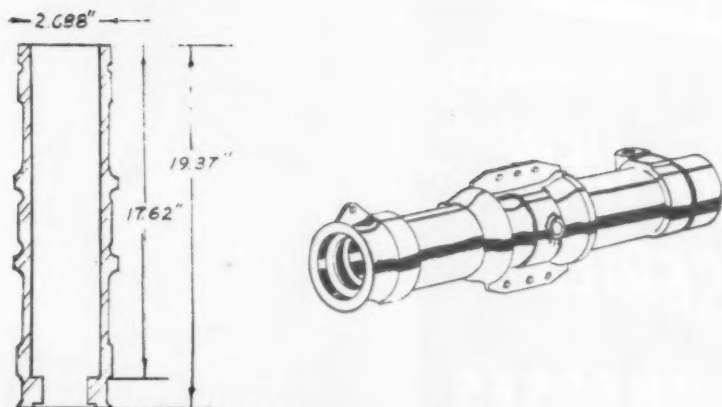
Write for Bulletin 1956

*Johnson*

**MACHINE  
and PRESS CORP.**

620 WEST INDIANA AVENUE • ELKHART, INDIANA

Circle No. 298 on Card, Opposite Page 65



SKETCH 2—ENGINE LATHE APPLICATION on an Actuating Cylinder

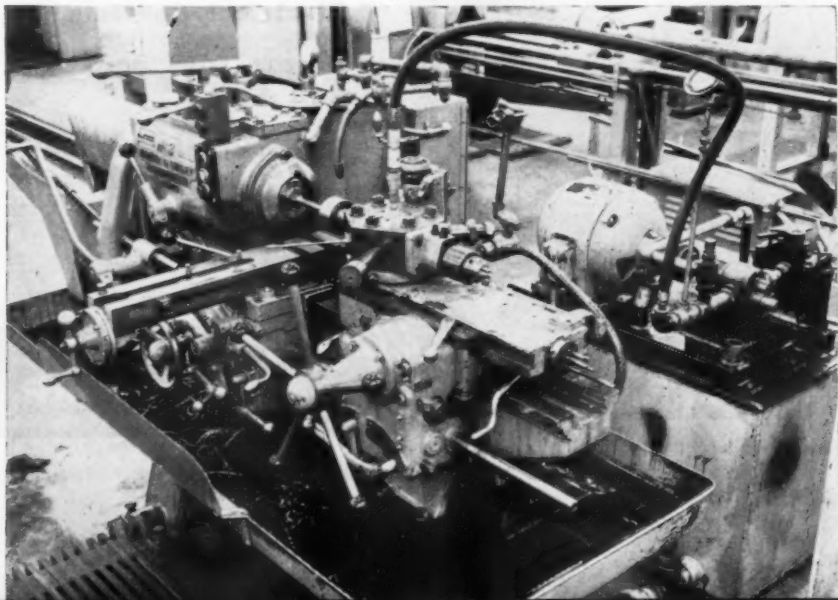
MATERIAL: 4140 CM Steel, 180,000 to 200,000 psi

#### CONVENTIONAL METHOD

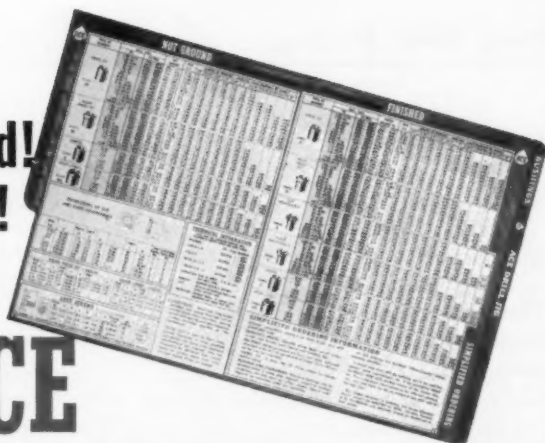
(Engine Lathe):

1. A 1" standard twist drill was run in as far as possible, at which point a 1" extension drill was used to complete the pilot hole.
2. A 2" standard twist drill and extension was then run through the pilot hole to enlarge it further.
3. The hole was bored to a diameter of 2.625".

FIG. 3—TURRET LATHE (Warner & Swasey) using target gun drill.



**Simplified!  
Complete!  
ALL NEW!**



# 1956 ACE DRILL BUSHING CATALOG



*Send name and address . . . just say . . .*

# FREE

*Send Catalog "D"*



Contains entirely new SIMPLIFIED ORDERING section having all necessary technical data for Finished and Not-Ground bushings. Covers over 24,000 ASA and ACE Standards, Micro and Super-sizes . . . 16 pages include data on ACE-LOK Bushings for embedment, Conversion Tables, List and Quantity Prices . . . Never before a more comprehensive Drill Bushing Catalog. Write for your free copy and name of nearest dealer.

**Stocking Distributors in All Important Industrial Areas**



**ACE DRILL BUSHING CO., INC.**  
5407 Fountain Ave., Los Angeles 29, Calif.

## Deep Hole Drilling

continued

4. The material was heat treated to 200,000 to 220,000 psi.
5. The hole was further bored to 2.664" diameter.
6. The hole was then honed to the finish diameter.

These operations took a total of 5 hours per part based on a 50 part set-up.

### GUN DRILLING METHOD

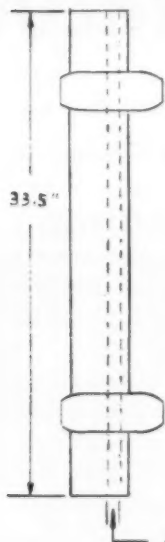
(Engine Lathe):

1. A 2.669" target gun drill with a 17 $\frac{3}{4}$ " cutting length was used

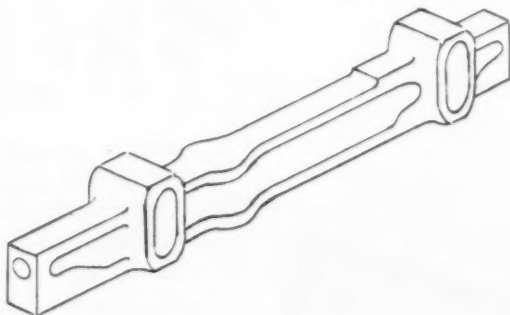
to drill the hole first.

2. The part was heat treated to 200,000 to 220,000 psi.
3. The part was then rough ground to 2.685" I.D.
4. It was then honed to 2.688". The hole diameter was held to tolerance of plus or minus .002, and a finish of 80 micro inches (rms) obtained.

These operations took a total of 36 minutes per part based on a 50 part set-up.



SKETCH 3—ENGINE LATHE APPLICATION on a Housing Assembly



### MATERIAL: Dural, 14S T6

The original manufacturing outline for this part called out the use of gun drills in machining the 33 $\frac{1}{2}$ "

deep hole on the 20" Monarch.

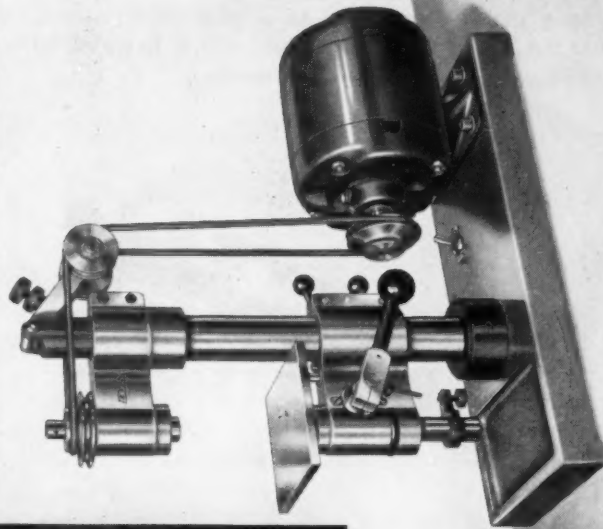
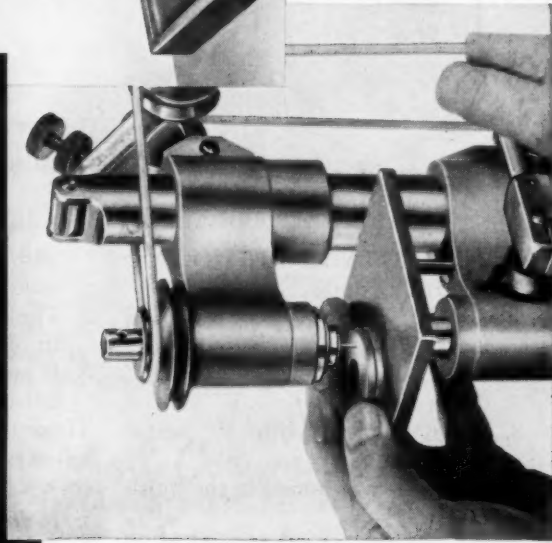
A target gun drill measuring 1.125" in diameter was used. The

SMALL DRILLS MUST BE HELD  
IN PRECISION COLLETS TO ASSURE ACCURACY

**LEVIN<sup>®</sup>** MICRO-DRILL PRESS

FOR VERY SMALL HOLES  
DOWN TO .002"

In the LEVIN micro-drill press drills are held in precision collets. Runout is reduced to practically zero and drill breakage from this cause is eliminated. Collets are available in a complete range of sizes down to .1 mm (.004").



Size of table is 3-3/4" x 4". Maximum table travel is 1-1/2". Minimum distance between table and end of spindle is 17-1/2". Precision ground spindle with four speeds: 1725, 2600, 3000, 4370 RPM. Motor is 1/2 HP, 110V 60C. The micro-drill press may also be had with a 3450 RPM motor, doubling the above speeds.

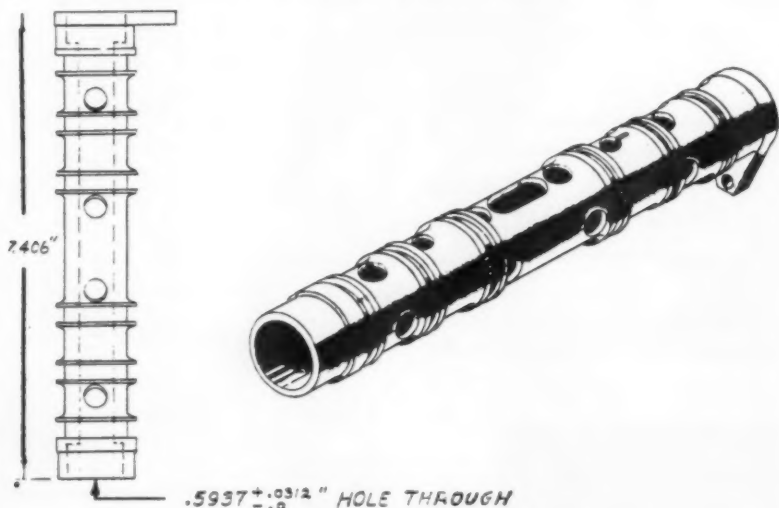
Send for catalog M describing complete line of micro-drilling equipment, collets, instrument lathes and precision tools.

LOUIS LEVIN & SON, INC.

3610 South Broadway • Los Angeles 7, Calif.

drilled hole was held to a maximum of .005" runout over the 33½" length. The diameter of the hole

was held to a plus .002", minus .000" tolerance, with a finish of 10 micro inches (rms).



SKETCH 4—TURRET LATHE APPLICATION on a Sleeve.

MATERIAL: 4131 Stainless Steel 125,000 - 145,000 psi

#### CONVENTIONAL METHOD

(Turret Lathe):

1. A 9/16" diameter pilot hole was first drilled in the piece.
2. It was then core drilled to .610" diameter.
3. Then reamed with a special .617" reamer.
4. Finally it was honed to the finish diameter.

These operations took a total of 36 minutes per part, based on a 50 part set-up.

#### GUN DRILLING METHOD

(Turret Lathe):

1. A .617" diameter target gun drill

- with an 8" cutting length was used to drill the hole first.
2. The part was then rough honed to .620" diameter.
3. It was then finish honed to the finish diameter.

These operations took a total of 18 minutes per part, based on a 50 part set-up.

***It should be remembered that Gun Drilling is no panacea for all drilling problems.***

Furthermore it must be kept in mind that the gun drill is an expensive precision tool and should never be thought of as merely a different type of drill.

# automation pays... EVEN ON SHORTER RUNS

Yes, it does—when you automate with *standard* Baker Basic machines. They cost much less than a machine specially built for only one part . . . and pay off quicker. For example, a manufacturer recently installed 3 Baker Basics on relatively low-production jobs. He estimates that the savings through automatic operation will pay for the machines in 3 years or less. Ultimately he will incorporate these Baker Basics into a transfer machine. Baker Basics can be retooled with comparative ease and at less expense. They needn't be completely "rebuilt" for a change in product or production method. For drilling, boring, tapping and other machining operations. In 5 sizes.



.. Mail Coupon Today....

**BAKER BROTHERS, INC., Dept. MT-656  
Toledo, Ohio**

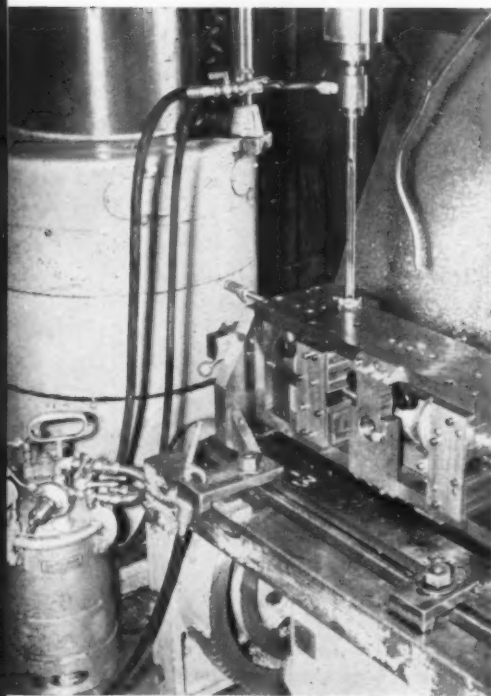
Please send free Catalog on Baker Basic machines.

NAME AND TITLE

COMPANY

ADDRESS

CITY ZONE STATE



**FIG. 4—GUN DRILL OPERATION on Cincinnati Radial arm drill.**

It is recommended that a central authority be assigned the task of storing and issuing all gun drills in the plant. This measure will prevent their being left in places where they may be lost or damaged, and help to prevent their being used on jobs where they should not be. This group should also have control over the grinding of all gun drills. Grinding should take place under

the close supervision of the controlling authority.

A control group should be established to perform the following functions if maximum value is to be realized through use of the gun drills.

### ***Part Investigation***

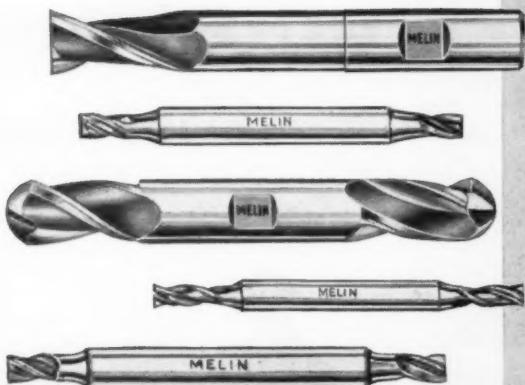
This body will consider each possible application for gun drilling on its own merit. For this reason, the members of the control group should be thoroughly familiar with the uses and limitations of gun drills. The authority for calling out the use of this type drill in a given application should be vested in this group.

### ***Development and Analysis***

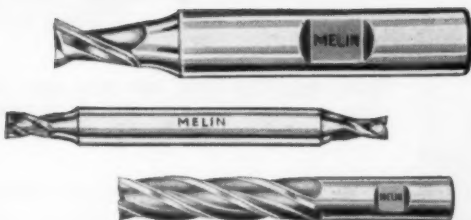
As it will often be necessary to use the trial and error method for establishing the actual procedure for using the gun drill, the control group should be able to perform, or have performed the experimentation necessary for establishing machining procedure.

### ***Manufacturing Outlines***

The control group should have the authority to issue (or advise the appropriate authority) that portion of the manufacturing outline pertinent to the gun drilling operations. . . .



# MELIN END MILLS



*Representatives in principal cities.*



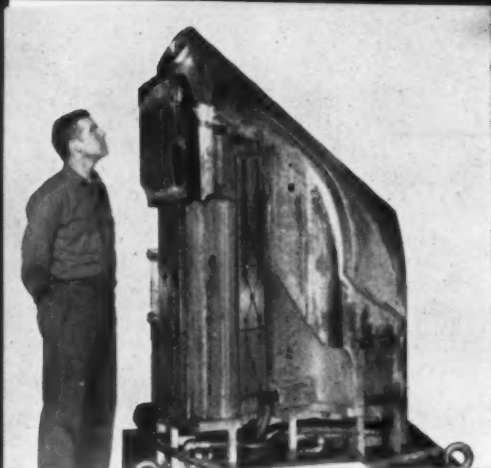
**MELIN TOOL  
COMPANY, INC.**

3374 West 140th Street  
Cleveland 11, Ohio



There is a difference  
in end mills . . .  
**MELIN** end mills!  
Proof of this  
is evident in the  
continued increase  
in **MELIN** popularity.  
The growth in  
**MELIN** tool acceptance  
was by no means an  
accident  
. . . The secret  
is in **CONSISTENT  
QUALITY**. This  
standard of Quality  
assures you better  
performance . . .  
longer lasting  
performance . . .  
**CONTINUOUSLY . . .**  
from one shipment to  
another.  
Next time you order  
end mills . . .  
specify the finest . . .  
specify **MELIN**.

**MANUFACTURED IN  
TWO, THREE AND FOUR  
FLUTE TYPES.**



LARGE AUTOMOTIVE DIES provide ideal examples of the proper application of flame hardening.

*There must be a thorough understanding of the basic factors involved in flame hardening. Only then can you fully appreciate how this process can increase the life of the wear surfaces of steel and iron masses.*

By **M. R. Scott**, President  
Detroit Flame Hardening Co.

• Custom decrees that the description of a process shall set forth its metes and bounds in terms of "scope" and "application." This we shall endeavor to do by defining the scope of the Flame Hardening Process in the broadest and simplest possible terms; thus:

***"Flame Hardening is a process of hardening a ferrous metal by***

# Flame

*The horizons*



LARGE ROLLS FOR PAPER AND STEEL MILLS are good examples of the scope of flame hardening. Their size limits are only those of gas supply and

***means of a high temperature flame and then cooling as required."***

It is when attempting to confine the application of the process to strict limitations of the same kind that one begins to encounter difficulty. While there is a consider-

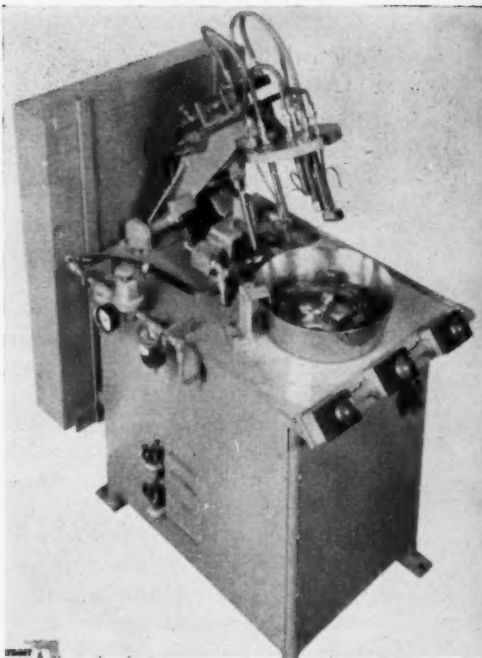
# Hardening

*are widening*



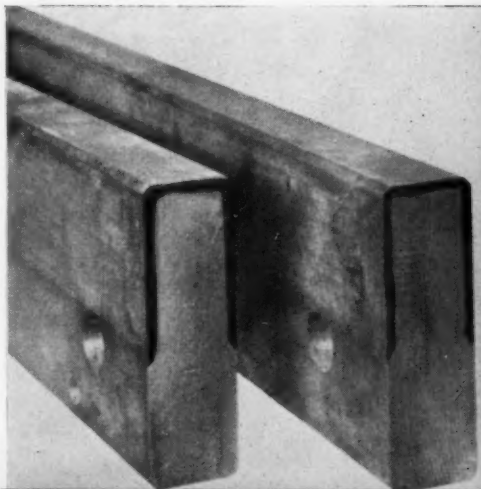
machines for handling parts in the range of 20 tons or more.

able overlapping in all heat treating methods, and such factors as economics, equipment, and experience must determine how and when a given process should be used, there are considerations which make flame hardening, in its optimum category, beyond serious competition. In flame hardening the



MODERN FLAME HARDENING MACHINE designed for handling clutch parts.

ETCHED MACHINED WAYS have depth of hardness in the area needed.



## Flame Hardening

continued

horizons are constantly widening.

***Flame hardening has been subject to all the misconceptions and wrong applications which hamper any new process.***

It is not expected that these will be corrected in the twinkling of an eye. It is only through understanding and appreciation of the basic factors that engineers and metallurgists will appreciate that this process is not one for the welding shop or blacksmith type of operation; for flame hardening, properly applied, encompasses the fields of mechanical, metallurgical, and chemical engineering. Even these may be inadequate if the practical aspects of steel making and foundry practices are disregarded or not thoroughly understood.

Beyond a doubt, the most misleading idea of all is that flame hardening can be done by an idle welder who has a torch and a length of garden hose. Probably, flame hardening did start that way, but that was a long time ago, and any fundamentally sound process must of necessity have been born at some time. Any process that survives its early growing pains earns its place in the armory of industry; it must meet a need.

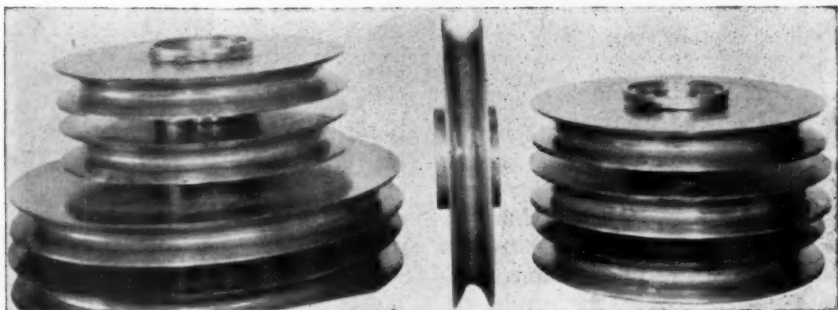
If, however, flame hardening is not to be done with a torch and a hose, what, then, are the impor-



**CRUSHER RINGS** or wear rings weighing many tons can have their service life extended by flame hardening the required surfaces. In such cases a hardness depth of  $\frac{1}{4}$  in. can be attained.

tant factors? Certainly both heat and quench media are involved. To answer this question fully, we must go further back than to the idle welder; he has been trained to observe metals in the fusion state—2000 degrees Fahrenheit or higher, depending upon what he has been welding.

***Flame hardening of the ferrous metals must be done in the 1500-1600 deg. Fahrenheit temperature range and the metal must be heated and quenched under perfectly regulated conditions.***



**SHEAVE WHEELS** for power shovels require groove protection only—flame hardening is the last operation and is both economical and fast.

A few of the steels encountered today can withstand the slow, uneven heating and immersion (or hose) quenching but the number is relatively small. Most of the steel and irons today are designed for a purpose; it may be high tensile strength, ductility, resistance to wear or corrosion, high hardenability, or a combination of these values. Hence, opinions should be sought from the metallurgist rather than the welder.

It has been stated that perfectly-regulated heating and quenching procedures must be followed to assure successful flame hardening. Here again, it is the metallurgist who knows how many things may result when steel is held too long, at too high temperature. It can oxidize rapidly and form a heavy scale which is detrimental to the

surface; it can undergo excessive grain growth and form incipient cracks upon quenching and, possibly worst of all, uneven heating may cause unnecessary distortion.

Technically, it may be disputed that uniform heating and quenching are of fundamental importance to a successful operation. Experience has demonstrated beyond question,



**COSTS OF CRANE WHEELS** can be reduced by completely finishing before flame hardening. They can be made of cast iron, ductile iron or rolled steel.

## Flame Hardening

continued

however, that the same types of specifications cannot be written for flame hardening as for parts subjected to furnace hardening. It is necessary to specify the type of material which, when flame hardened, will produce the results desired in the finished part. In setting up these specifications there is a factor which is easily comprehended but rarely discussed; namely, the possible "double quench" effect which occurs when large masses are flame hardened.

The heating rate, normally, is adjusted to provide a hardened case of approximately  $\frac{1}{8}$  in., with the heat penetration probably not exceeding  $\frac{1}{4}$  in. When a drastic spray quench follows this heating, a similar (but less severe) quench occurs from the mass effect of unheated steel or iron immediately under the heated zone. Hence, it is possible to arrive at the maximum hardness from the chemical analysis of the material. In other types of hardening, efforts are made to obtain high hardness by means of alloys and special hardening agents. Flame hardening, on the other hand, frequently permits the use of less expensive grades of steel and iron because flames are cheaper than alloys.

The metallurgist, understanding all these factors, is now ready to dispose of the problem by consign-

ing it to the mechanical and chemical engineering departments. The answer, when it comes, may be simple to state but considerably more difficult to produce.

***To do effective, economical flame hardening the high temperature gases such as acetylene, propane, and natural gas must be combined with oxygen in suitable ratios to provide the highest possible flame temperature consistent with safety.***

The ideal gas combination will provide a flame temperature in excess of 5000 deg. Fahr. and must be available in sufficient volume to enable flame hardening to operate in its optimum range. While no standard can be set, this may require mixed gases in the flow range of 8000 cu. ft. per hour or more, depending upon the object to be flame hardened.

Automation, a relatively new word that is in danger of being overworked and misunderstood, applies at present to a most important phase of flame hardening. Indeed, automation may well be the deciding factor or the difference between successful and unsuccessful flame hardening. We do know that without it flame hardening was a blacksmith's tool while, with it flame hardening has become a valuable asset to the machine tool industry.

**Memo that kept a production line running!**

**MEMO:**

TO: *Production — Bill H.*  
FROM: *Purchasing*

*Bill — Regarding that Carbide  
drilling + reaming problem you  
called about — I've checked  
carefully and am calling in a  
Chicago Latrobe service-engineer.  
I understand they are top  
trouble shooters on this kind  
of job.*

*Good  
you've called  
the right man J.R.  
Bill H.*

Chicago-Latrobe  
makes carbide  
drills and reamers  
of a quality that  
is unsurpassed—  
in a complete line  
—and backs these  
tools with the kind  
of service that  
keeps the  
production line  
running.  
Try them and see.

# Chicago- Latrobe

**CARBIDE DRILLS and REAMERS**

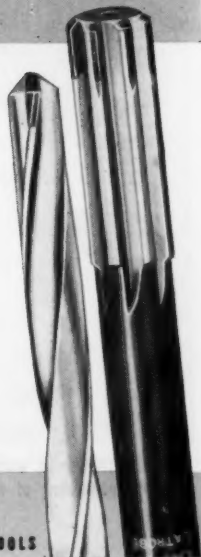


Stocked and sold by  
service-minded Industrial Distributors

**CHICAGO-LATROBE**

418 W. ONTARIO STREET • CHICAGO 10, ILLINOIS

DRILLS • REAMERS • COUNTERSINKS • COUNTERBORES • SPECIAL TOOLS



Circle No. 303 on Card, Opposite Page 65

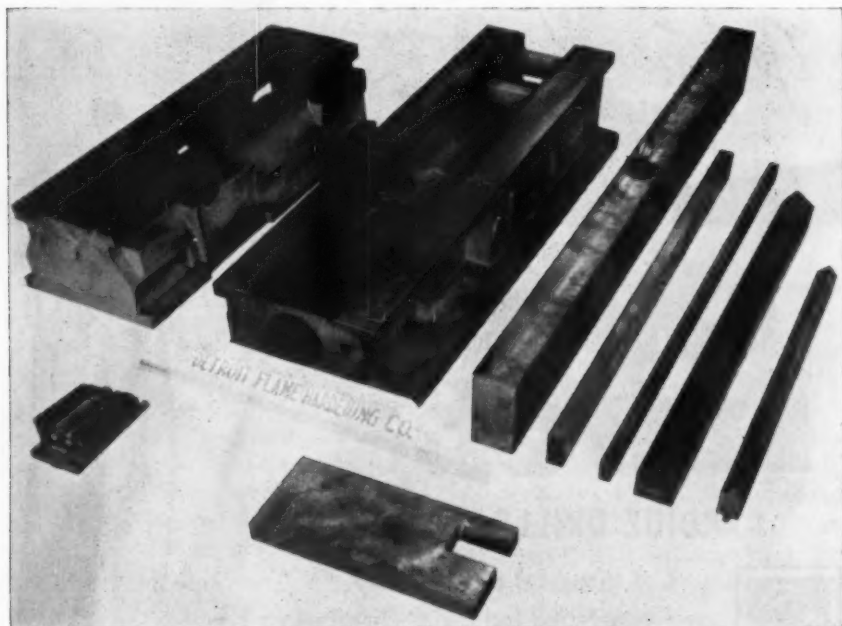
The flame hardening process is, in fact, more closely related to the machine tool field than it is to the heat treating industry because of its dependence upon accurate motivation of the heating equipment. Realization of the full import of this factor has created an insistent demand for flame hardening machines to do specific hardening jobs. These machines have taken their place in production lines of many types today and are performing services that would be impossible by any other method.

When the factors for successful flame hardening have been defined

and placed in service, one thing becomes apparent:

*There are areas with which other heat treating processes find it difficult, if not impossible, to compete.*

A statement so broad can obviously be challenged but an analysis of the service requirements of some specific part may disclose that other methods are able to deliver little more than surface treatment because of extreme distortion, high local hardness, or metal mass, whereas further analysis will reveal that freedom from distortion, lo-



**MODERN TREND IN MACHINE WAYS** is to make the way an integral part of the base or the way can be made separately of steel or cast iron and then flame hardened.

**NOW!**

## **EMPIRE'S LUERS CUT-OFF BLADES...**

**Precision Ground on All Surfaces**

These new Luers blades are held to precision tolerances on centrality and parallelism. Close tolerance grinding of all blade surfaces assures:

1. Accuracy of blade size and complete blade interchangeability.
2. Centrality of head to shank held to close tolerance.
3. Better blade cutting edges, longer blade-life, smoother cut-off surfaces



In addition you get all the established features of the Luers design, such as: hollow ground top which results in free chip action and cooler operation; constant side and angular clearances; resharpening on front face only.

Standard Luers blades are available from stock in 4 grades of high speed steel and in 4 grades of carbide tips. Solid cast alloy blades are also available on customer order.

*Made under license issued by John Milton Luers*

**EMPIRE**

**8780 GRINNELL AVE.**

**TOOL COMPANY**

**DETROIT 13, MICHIGAN**

Circle No. 304 on Card, Opposite Page 65

## Flame Hardening

continued

calized hardness and metal mass are essential advantages to the flame hardening process.

It once was generally thought that flame hardening could be applied only to such items as gears, cam wear surfaces, and other small tasks of a like nature. While great quantities of such parts still owe their superior hardness to flame hardening, it must be conceded that the really important and exclusive advantages of the flame hardening process are to be gained in the field

which is quite beyond the range of furnaces or induction hardening equipment.

There are many ways in which flame hardening departs from conventional or furnace treating procedures.

*Furnace hardening, which involves heating the entire mass of a part, can normally be done only on a price-per-pound basis. In flame hardening, the mass of the part is relatively unimportant and prices are based upon the area subjected to wear. . . .*

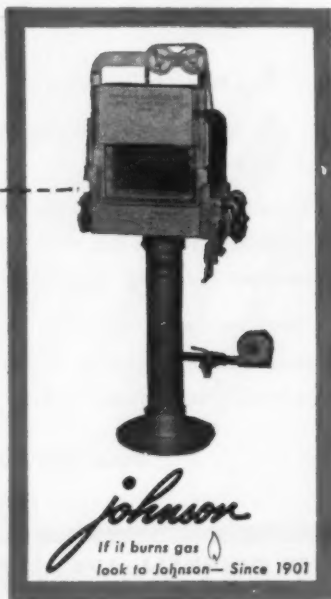
## HEATS FAST SAVES TIME

*johnson*

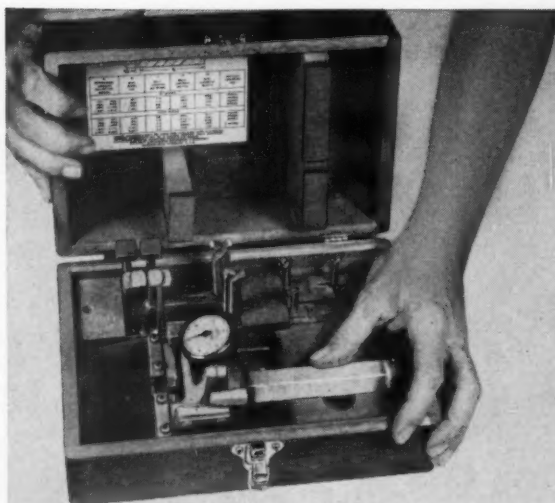
### NUMBER 142 HEAT TREATING FURNACE

Powerful burners in this efficient furnace get heat up to the 1300°-2350° F. range in minutes. Temperatures accurately and quickly regulated. Does fast job with high speed and carbon steels. Ratchet-operated door opens upward. High temperature, refractory-lined firebox is 7" by 13" by 16½". 200,000 BTUs per hour. Carbofrax hearth, G.E. Motor and Johnson Blower included, F.O.B. Factory ....\$337.00  
*Write today for free Johnson Catalog*

**JOHNSON GAS APPLIANCE COMPANY**  
570 E Avenue NW, Cedar Rapids, Iowa



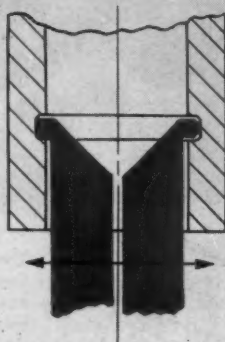
Circle No. 305 on Card, Opposite Page 65



Full line contact for long segment wear.



Straight line motion guarantees accurate measurement over full range.



## BRYANT GROOVE GAGE

**This Kit Checks Grooves for**

**O-Rings — .421 to 4.870 Diameter.**

**Snap Rings — .267 to 5.266 Diameter.**

- Line contact assures long segment life
- No bearings or sliding members to wear
- Selected Northern hardwood case
- Immediate shipment from stock

Special segments available for checking non-standard grooves, concentricity of groove to bore, or depth of groove to face.

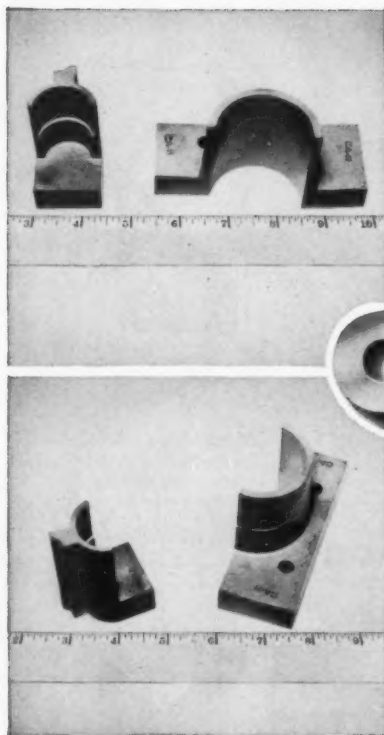
Groove segments can also be used on the Bryant B-21 Bench Gage.

WRITE FOR FULL INFORMATION ON BRYANT GAGES

## Bryant Gage & Spindle Division

P. O. Box 620-E, SPRINGFIELD, VERMONT

Division of Bryant Chucking Grinder Company



Look How You Can  
Save with  
**PREFORMED**

**CARMET<sup>®</sup>**

**DIE SECTIONS**

these Blanks are preformed  
to a Finishing Allowance  
of .018"-.022" per side



Write for Your Copy:  
**CARMET CATALOG**

Just out . . . 32 well-illustrated pages, containing data on all Carmet grades, and on Carmet blanks, tools, die sections, punches, draw die inserts, etc.; also special preforming to order.

● Write for your copy.

Address Dept. MB-78

These tungsten carbide die sections are of Carmet CA-11, a special grade developed expressly for punches, dies, and other heavy shock applications where wear and abrasion resistance are required.

These blanks have a span of 1.315" with a wall thickness of only .046", but they were easily produced to close tolerances by AL's precision preform methods. All surfaces are clean, smooth and free from defects, requiring only a minimum amount of grinding to final dimensions.

Carmet carbides can be accurately produced to practically any shape or size your designs may require, and can be supplied preformed as desired. Typical highly successful applications include inserts for drawing, heading, extruding and blanking dies; gauge and wear parts; pins; bushings; etc.

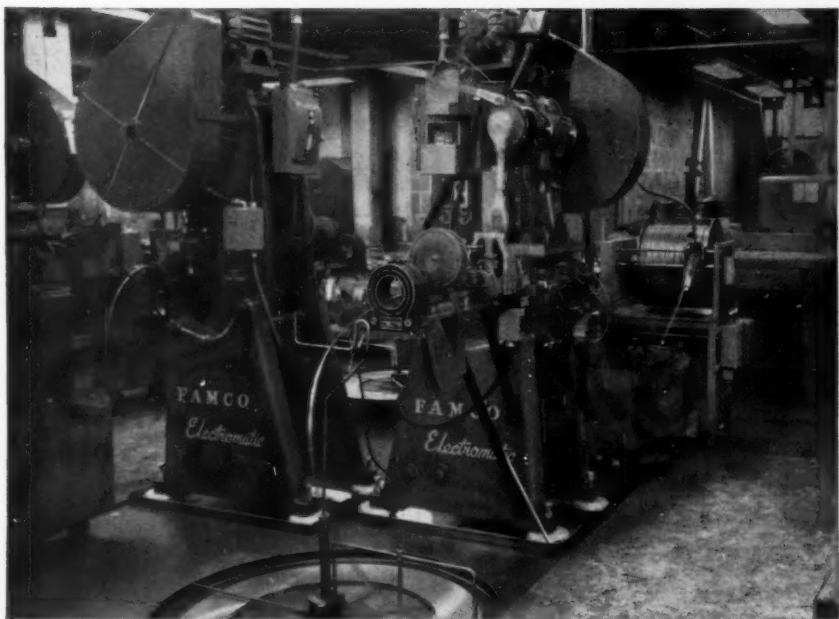
Find out, TODAY, how you can cut costs with preformed Carmet. Write or call Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Mich.

For ALL your CARBIDE needs, call  
**Allegheny Ludlum**

Circle No. 307 on Card, Opposite Page 65



MACHINE and TOOL BLUE BOOK



Two of 10 Famco 18 Ton Power Presses perforating high carbon steel for a new type 98 chrome oil ring at Perfect Circle's Hagerstown, Indiana plant.

## THESE FAMCO POWER PRESSES *are running by themselves!*

It may seem odd to see a power press working with nary an operator in sight. Odd but effective. And profitable. As a result of the continuous stroke action of Famco's ELECTROMATIC CLUTCH, only *three men* are needed to run the *entire* battery of ten Famco Power Presses. They run 24 hours a day, 6 days a week . . . and process 8,000 feet of high carbon steel ribbon per hour.

A large die holds a series of three smaller dies arranged to perforate, form and restrike ribbon steel into the spacer expander section of the 98 chrome oil ring, at the rate of one inch for each stroke of ram. Ram travel (crankshaft throw) is one-half inch.

The 9-point, electrically operated jaw clutch can be changed from single stroke to continuous action *while the press is running!* Write today for Famco Power Press Catalog—no obligation.



**famco machine company**

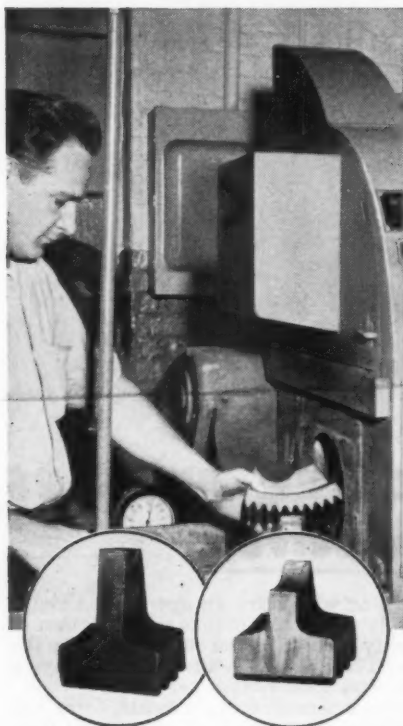
3118 SHERIDAN ROAD • KENOSHA 46, WISCONSIN

Arbor Presses • Air Presses • Drill Presses • Band Saws  
Power Presses • Foot Presses • Squaring Shears

# Abrasive Cutting

*the best way to cut many materials  
the only way to cut some*

## Campbell Cut-Off Machines



Rough, serrated cut  
of metal saw

Smooth-finished cut  
of CAMPBELL Abrasive  
Cut-Off Machine  
with ALLISON Wheel

### Smooth cutting saves grinding operation for American Gear & Mfg Co.

Cross sections of gear teeth—smooth, fine-finished and ready for metallurgical study—save an entire grinding operation at the Lemont, Illinois plant of American Gear & Mfg. Co., a division of Brad Foote Gear Company.

These test samples are neatly "sliced" down to a single gear tooth in thickness on a CAMPBELL 406 Oscillating Wet Abrasive Cut-Off Machine, equipped with just the right ALLISON Abrasive Wheel for the job. These sections with fine finish, no hard spots, no change in metallurgical characteristics, come from the WET cut with abundant coolant applied just where it does the most good. It's the OSCILLATION of the abrasive wheel... the right one for the job... that handles big cuts like this with speed and economy.

What is your metal cutting problem? Does it involve cutting of alloy or high carbon steel? Our Field Engineers, abrasive cutting specialists, can help you arrive at that particular combination of CAMPBELL Cut-Off Machines and ALLISON Cutting Wheels that will improve your operation and save you money.

*Let us send you  
this book*



**ACCO**



**Campbell Machine Division  
AMERICAN CHAIN & CABLE**

937 Connecticut Avenue, Bridgeport 2, Connecticut

Circle No. 309 on Card, Opposite Page 65

*Installation of*

## Numerical Cam Miller

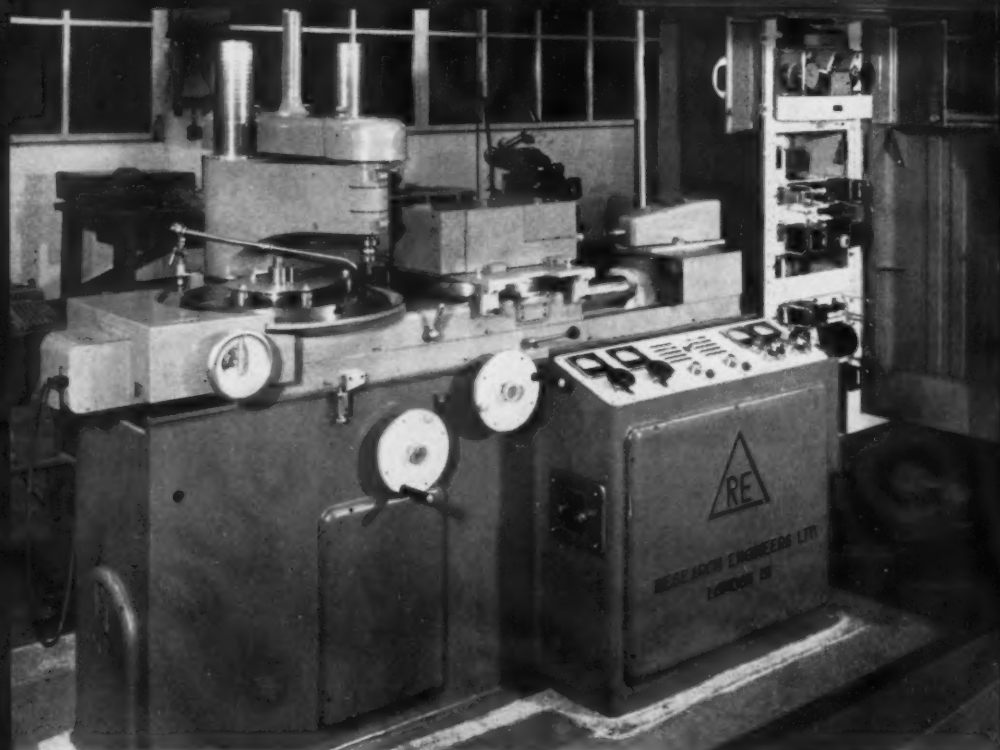
*... marks British progress in machine tool automation*

- **punched-tape system**
- **point-to-point interpolation**
- **adaptable to polar or x-and-y co-ordinates**
- **optimum cutting speeds computed**

● Believed to be the first practical example of automation applied to machine tool control in Britain, an electronically controlled milling machine for precise copying of two-dimensional cams has been installed at Laurence, Scott and Electromotors Ltd., Norwich, England. Based on a copy-miller made by Research Engineers Ltd., the machine was modified for fully automatic control by Electric and Musical Industries Ltd. of Hayes, Middlesex, England. The E. M. I.

system of control can be applied to other machines.

Automation applied to machine tool control involves the use of a computer which can accept information regarding the part that is to be made and deduce the necessary actions of its associated cutting tool, causing this to move, by servo-control of the feeds, so as to produce the required part. If the computer can assimilate information in a form that is quick and cheap to prepare, then the system will have all the advantages of a copying machine without the cost and labor of making templates, so that short runs or prototype parts can be produced as cheaply as the longer runs. New parts can be produced immediately the design is complete and without the need for a master, all the parts being made to the same high degree of accuracy, without the



Closeup of the electronically-controlled miller, with control unit doors open. Top compartment houses tape reader unit, while below and behind it are the information stores, interpolater and servo-amplifiers. At extreme left is encoder operated by a typist, which produces simultaneously the perforated tape and a typed record of the data.

inevitable slight loss of precision which occurs when copying.

In the E. M. I. system of electronic machine tool control the information is presented in the form of a table of dimensions, which is often prepared in the drawing office as a preliminary to making drawings. If not, it can readily be produced from the drawings, no great skill being required. The table of dimensions describes the profile to be cut by specifying a series of points along it. The Norwich machine has a rotating work-

table and for this reason the dimensions are in Polar co-ordinates. In the case of a Cincinnati No. 3 vertical milling machine, for example, on the other hand, the dimensions would be in Cartesian (x-and-y) co-ordinates. To obtain maximum accuracy at least two points must be specified for every  $\frac{1}{8}$ " of profile, but if lower accuracy is acceptable, faster machining can be obtained by using wider spacing.

The table of dimensions is copied by means of a modified teletypewriter, which encodes the figures as



## LIER SWIVEL-PAD CLAMPS

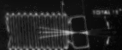
*Now Available in 2 Types!*

**Both types have these outstanding features!**

- Screw torque absorbed by pad — not the work piece.



- Unique ball-joint construction provides extremely smooth angle adjustment and rotation of pad.



- Pad swivels  $7\frac{1}{2}^\circ$  each side of center line in all directions.



- Large flat pad area assures tighter clamping.

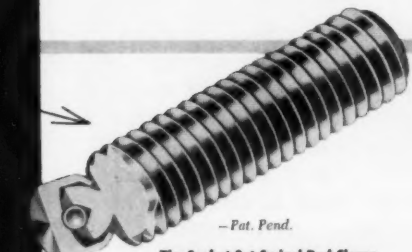


- Conical seat distributes clamping pressure uniformly.
- Eliminates costly, custom-made swivel pads.
- Du-Lite finish for rust proofing.
- Made from heat-treated, alloy steel to last for years.



### The new Knurled Head Swivel-Pad Clamp

Use when finger-type clamping is sufficient. Wide knurled-head gives good gripping; assures fast screw run-in. Available in 4 different screw diameters;  $1\frac{1}{2}$ " and 2" screw lengths.



— Pat. Pend.

### The Socket Set Swivel-Pad Clamp

Use wherever maximum rigidity is necessary, or where space is limited. Available in 7 screw diameters; various lengths.

#### Other Vlier products



Spring Plungers



Spring Stops



Toggle Pads



Fixture Keys



Torque Thumb Screws



**VLIER ENGINEERING**  
INCORPORATED

8900 Santa Monica Blvd., Los Angeles 46, California

Write for  
free 1956  
Vlier catalog.

Distributors located in major U.S. and Canadian industrial areas.

Circle No. 310 on Card, Opposite Page 65

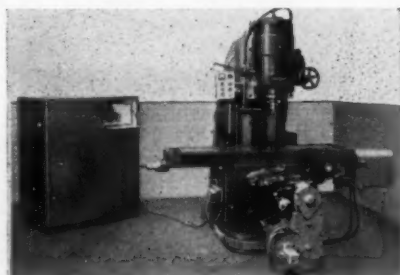
## News of Automation

continued

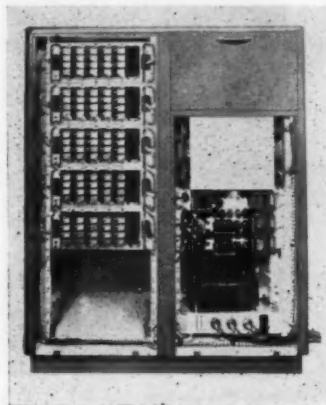
perforations in a paper tape. It is in this form that the information is acceptable by the machine. The teletypewriter will operate as fast as the typist can work. On the  $\frac{5}{8}$ " paper tape the figures are represented as transverse rows of holes, twenty five-digit dimensions occupying one foot of tape. At the same time the writer makes a typed record for checking and filing. An error in transcription can be corrected by pressing the erase key and retyping the figures correctly.

By running the tape through the "reading head" of the control unit of the E.M.I. machine the data it contains is transferred to the information store. To reduce complication the spool on which the tape is wound is made to run at a speed which corresponds to the cutting speed of the machine, and the information held in store at any moment always refers to a number of points on either side of the place where the machine is cutting. Since the information defines a series of discrete points, whereas the profile cut must be a smooth curve, the control unit incorporates an interpolator. This deduces from the information in the store exactly how the table must move so that the cut will always follow a smooth curve through the given points and feeds appropriate voltages to the servo-control units driving the motors on

the leadscrews. This reduces to a minimum the number of dimensions to be worked out and listed in the table. The cut is smooth and true and does not require hand finishing or "blending."



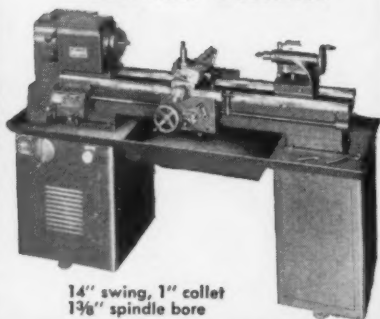
Interior of control unit, comprising tape reader, information store, interpolator, servo-control units and power supplies. Relays are all standard types, and the relatively few tubes used are run below their normal ratings to ensure long life.



Complete installation of numerical-control unit on a No. 3 Cincinnati miller. Longitudinal and transverse feeds of the milling machine are servo-controlled and the leadscrews are equipped with position-identifying feedback mechanisms.

# Logan

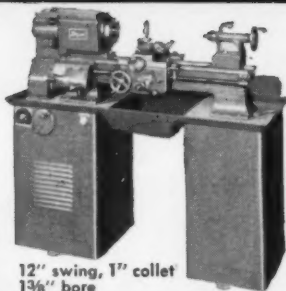
THE LATHES FOR  
SUSTAINED ACCURACY



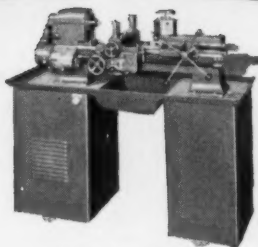
14" swing, 1" collet  
1 1/8" spindle bore

You can continue to depend on Logans for precision results. On every type of lathe operation Logan sustained accuracy keeps performance at top efficiency. Ruggedly proportioned as well as precision built, Logan Lathes keep their accuracy after years of use in tool room, shop or production.

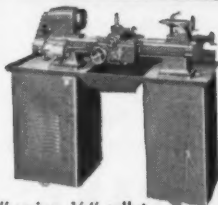
*Screw Cutting and Turret Lathes  
In a Wide Range of Sizes  
9", 10", 11", 12" and 14" swing, all  
with Logan advanced design features.*



12" swing, 1" collet  
1 1/8" bore



11" swing, 1" collet  
1 1/8" bore



10" swing, 1/2" collet  
25/32" bore



9" swing, 1/2" collet  
25/32" bore

See your Logan dealer,  
or write for  
catalog information.

**LOGAN ENGINEERING CO.**  
4901 West Lawrence Avenue, Chicago 30, Illinois

# CHECK MASTER



FOR MANY JOBS—IN MACHINE TOOLS—ON SURFACE PLATES

Exceptionally Versatile  
Mounting Holder enables  
widely varied use.

Hand Movement Always  
Clockwise, whichever way con-  
tact is moved. No reversing latch.

Light Contact Pressure is  
uniform for both directions of  
contact point motion.

Unusual Sensitivity gives  
response to smallest dimensional  
differences.

WRITE FOR DESCRIPTIVE BULLETIN

## MODELS



No. X

Graduated .0001"  
Range .008"

Both a .0001" and a .001"  
indicator. Change-over by  
simple substitution of contact  
point. Dots represent thou-  
sandths when using longer  
contact point.

No. XB



Regular and Non-Magnetic Models  
All Models Light in Weight & Fully Jeweled

## STANDARD GAGE COMPANY, INC.

MEASURING INSTRUMENTS FOR PRECISION INDUSTRY

105 PARKER AVE.



POUGHKEEPSIE, N. Y.

Circle No. 312 on Card, Opposite Page 65

### Indexing Milling Fixture Built Around Standard Collet

by Alex S. Arnott

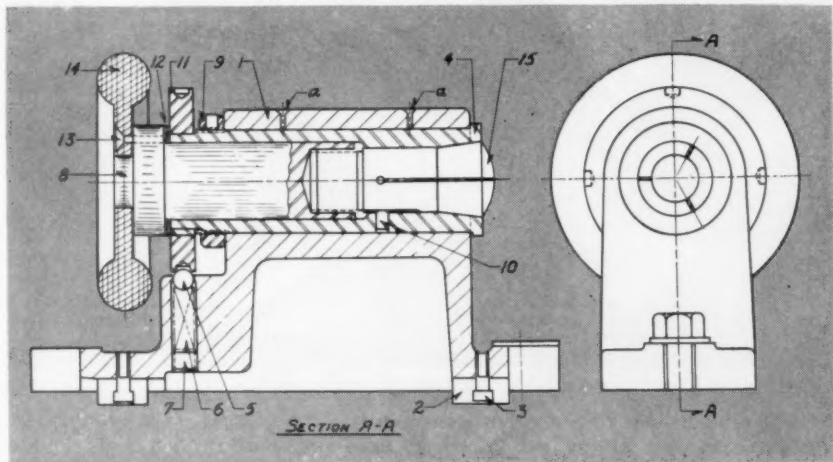
This fixture was designed to use standard lathe and milling machine collets for holding small circular work for various milling, slotting and finishing operations. Figure (2) shows examples of operations that may be done with this type of fixture. Standard square, round and hexagonal bar stock can be held.

The fixture body is cast iron, cored at the base to reduce weight. The base is equipped with milling machine keys.

Sleeve (4) is hardened tool steel and

is shouldered at the collet end to bear against the casting surface. The inside is bored and tapered to suit a standard collet. To hold the collet and sleeve at various indexed positions, ball (5) is assembled into a bore in the base and fits into a taper. Compression spring (6) backs up the ball, held by headless set screw (7).

Spacer (8) is bored and threaded to receive the standard collet; its OD is a sliding fit in sleeve (4). Collar (9) is threaded for the sleeve to pull it



Indexing milling fixture employs standard collet. Spring-loaded ball is used.

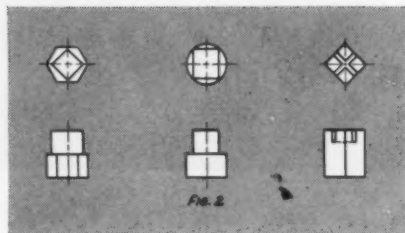
## Shop Hints

continued

snugly against both ends of the casting. Key (10), inserted in the sleeve, prevents the collet from turning when tightened and released from the sleeve. Indexing plate (11) is machined with indexing holes as required to index the work piece. A key between the plate and the collet moves the assembly as a unit.

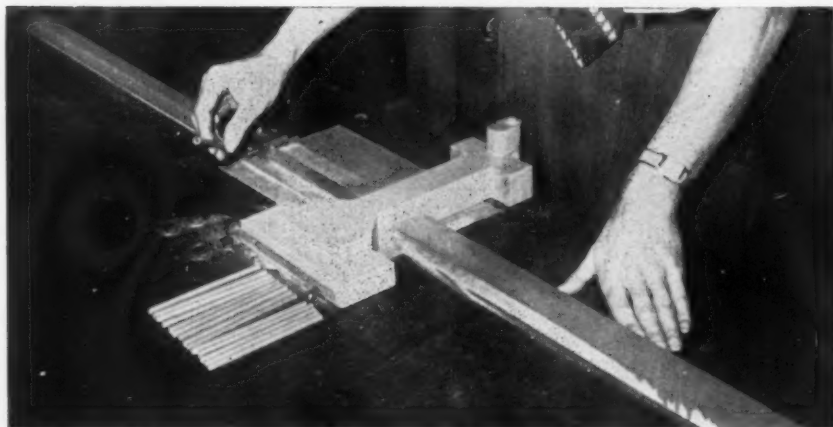
(12) is a washer between the handle and the indexing plate. Hand wheel is made of hard fibre and is fastened to the sleeve. Oil ways at (a) provide lubrication.

In operation of the fixture, the part is inserted in the collet and the hand wheel is turned, drawing the collet



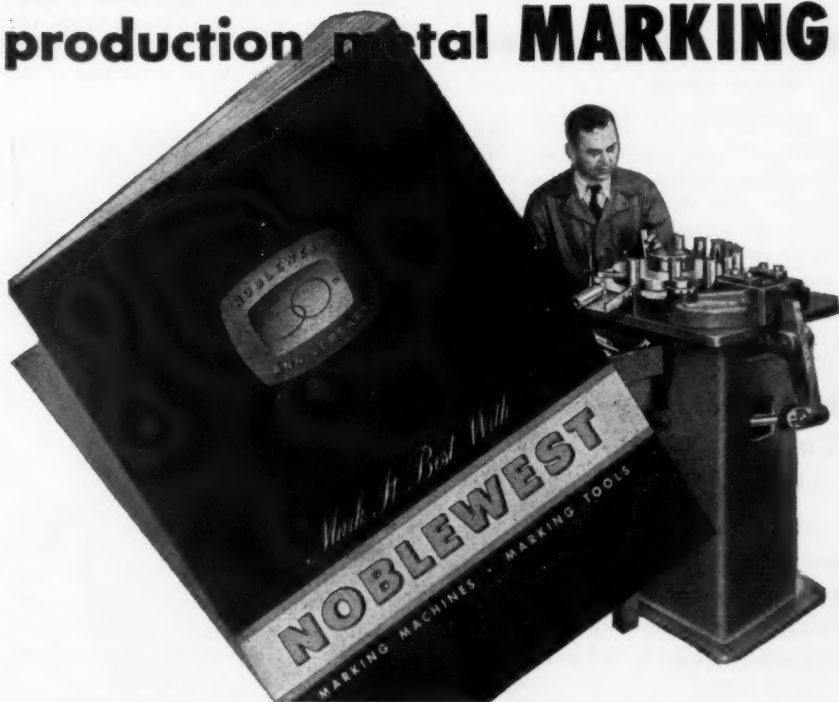
along the taper of the sleeve and closing it firmly on the workpiece. To index the work for the second operation after the first is completed, the hand wheel is turned in a direction against the collet threads. This forces the indexing ball to back away, releasing it from the index hole, and as the indexing plate continues to revolve the spring holds the ball against the plate surface until the next hole is reached.

## Protective Housing on Cut-off Saw



This protective housing on the cut-off saw prohibits the operator's hands from coming in contact with the blade, eliminates chips flying about, and contains dust. It was developed and is used by Walter Kidde & Company, Inc., Belleville, N.J. The operator simply slides aluminum tubing along the guide until it hits a stop (which can be set for various lengths). Then by touching a foot pedal the cut is made by the blade.

# NEW GUIDE to modern production metal MARKING



BACKED BY

**50** Years  
Experience

AS MASTERS OF  
METAL MARKING

For half a century NOBLEWEST has been solving industry's marking problems . . . designing and building equipment for faster, better, *permanent* marking of metal products at lower cost. Our new catalog contains the complete line of NOBLEWEST Marking Machines and Marking Tools including many new developments in better marking. For your copy, just send us your name and title on your company letterhead. Noble & Westbrook Manufacturing Co., 9 Westbrook Street, East Hartford, Connecticut.



## Shop Hints

continued

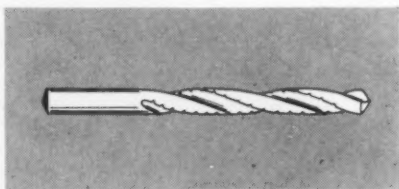
### Notched Drill Breaks Burrs

by William Martin

We do a great deal of drilling of sheet metal and structural shapes in our shop using electric hand drills. We had trouble from the tendency of the drill to break through and "thread" itself on the two burrs. Then the drill stopped short when the burrs hit the top of the flutes. At times this has been the

cause of drill breakage.

We have found that small notches ground along the edge of each flute, beginning about a half-inch from the drill point, serve to saw off the burrs and prevent the shock at the end of the flute.

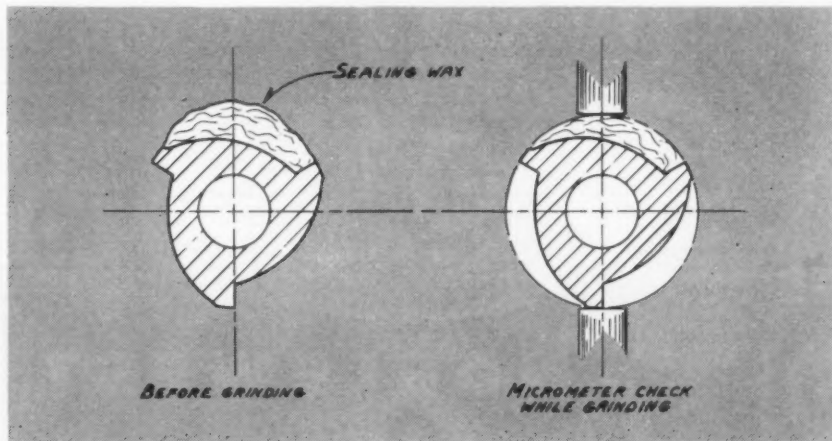


### Miking Uneven-fluted Drills, Counterbores, End Mills

by Harry Loeb

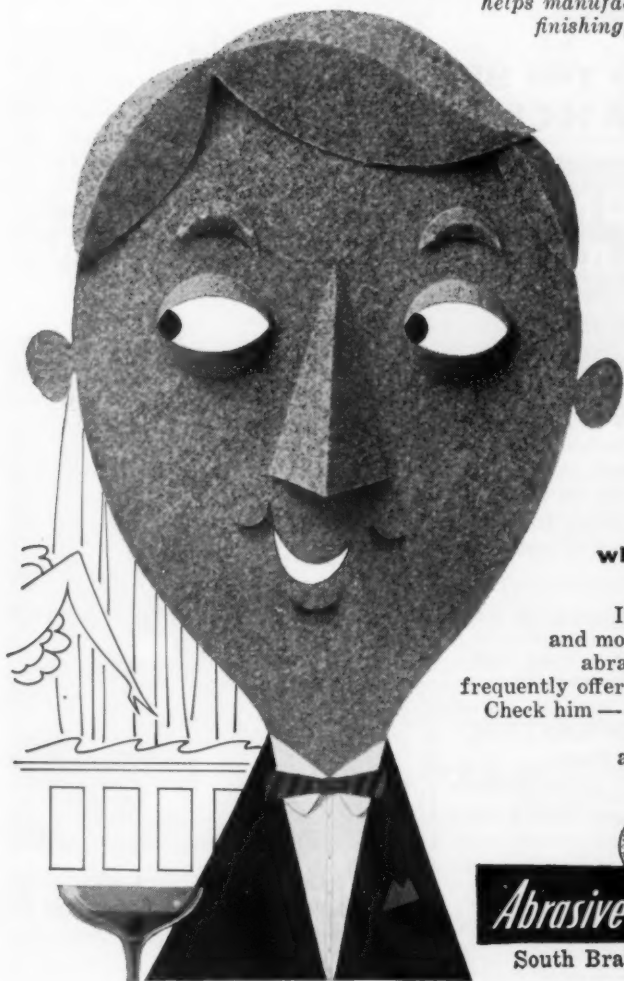
Micrometer checks on drills, counterbores, end mills, etc., having an uneven number of flutes can be done conveniently by applying common sealing wax as shown to tool to be ground.

Sealing wax will hold, provided it is applied hot (by match or small burner) on a clean surface. It will then stay hard during grinding if tool is wet ground, and provide an excellent measuring surface opposite the ground flute.



**NO. 2** *"Roughing it"* with  
Reddy MacFlint

*"Talk about a 'plushy joint'  
— you should see the velvet joint  
on JEWEL BRAND Abrasive Belts!  
It's smooth! Won't bump or jump . . .  
an AP development that  
helps manufacturers speed up  
finishing, improve quality."*



**"Smoothing  
the way  
where the going  
is rough"**

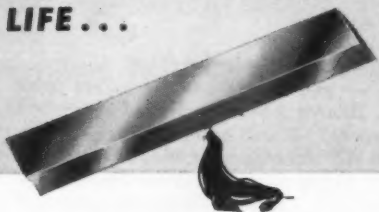
In addition to better  
and more efficient uses for  
abrasives, AP salesmen  
frequently offer new developments.  
Check him — if you're interested  
in improving  
an abrasive process.



***Abrasive Products, Inc.***

South Braintree 85, Mass.

**LONGER CUTTING  
LIFE ...**



**the BONUS you get  
in BALANCE**

## duMONT TOOL BITS

*High Speed, Ground  
Square and Rectangular*

An almost perfect balance of *toughness, red hardness and wear resistance* enables duMont Tool Bits to hold a keener cutting edge longer, gives you a bonus of cutting life in every bit.

Fill in the coupon below to get full information. Then make your own performance tests. You'll see what a difference balance can make.

**The du MONT CORPORATION,  
Greenfield, Mass.**

**MAIL FREE Tool Bit COMPARISON  
CHART, CATALOG and PRICE LIST  
— to**

**Name.....**

**Company.....**

**Address.....**

Circle No. 315 on Card, Opposite Page 65

172

## Shop Hints

continued

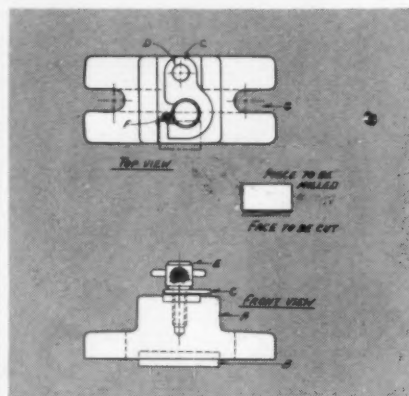
### Swing Clamping Fixture

by Alex S. Arnott

A quick and accurate method of holding small work pieces in a milling fixture is illustrated. This tool is made up of a machine steel body (A) with a swinging plate (C) pivoted at (D) and a clamping screw (E). The key (B) and slots (G) align it with the milling machine table.

A slot is milled thru the top of the fixture to accommodate the work piece and pin (F) locates the work for depth in the fixture.

The work is placed in the fixture and the clamp swung into place and held there with the action of the clamping screw.



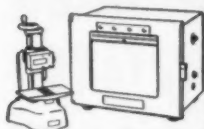
**SWING CLAMPING FIXTURE** offers quick and accurate method of holding small workpieces for milling. Made of machine steel, it includes pin to locate workpiece in depth.

MACHINE and TOOL BLUE BOOK



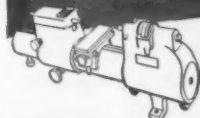
#### PRECISION GAGE BLOCKS

Basic master standards  
of measurement, accu-  
rate to millionths.



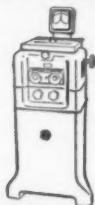
#### MILLIONTH COMPARATOR

Checks Gage Blocks to  
millionths of an inch.



#### SUPERMICROMETER

Reads direct to .0001"



#### ELECTROLIMIT UNIVERSAL INTERNAL COMPARATOR

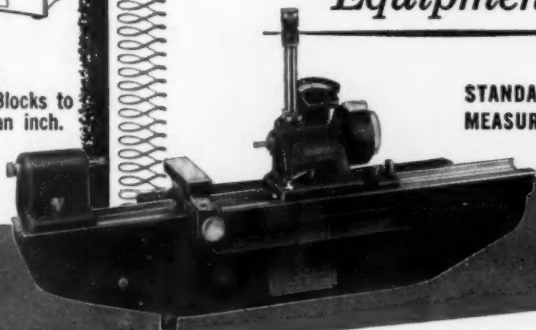
Reads direct  
to .00002"

## *To Insure Quality* **INSURE PRECISION**

*Use*

### **PRATT & WHITNEY** *Basic Measuring Equipment*

#### STANDARD MEASURING MACHINE



To get the best possible Quality-Insurance in your plant, first determine the *correct* degree of precision for your products . . . and maintain those limits by using Pratt & Whitney Basic Measuring Equipment as a constant check on the accuracy of your *working* gages.

Heart of P&W Precision-Protection is the Standard Measuring Machine . . . reads directly to .00001" . . . basic unit in any Standards Room. Equally important is the other equipment shown here.

To underwrite Quality, insure Precision and receive lasting dividends, write today for complete information on P&W Basic Measuring Equipment, outlining your Quality requirements.



#### **PRATT & WHITNEY COMPANY** INCORPORATED

22 Charter Oak Boulevard, West Hartford, Conn.  
Direct Factory Representatives In Principal Cities

**MACHINE TOOLS • GAGES • CUTTING TOOLS**



# Electrical Discharge Machining

saved \$448  
sinking this  
forging die  
using BRASS electrodes

## Conventional Method

Mill Cavity (Man and Machine)	56 hours
Hand Finish (Experienced die sinker)	52 hours
<b>TOTAL</b>	<b>108 hours</b>

## ELOX method

Forge Electrode (Man and machine)	2 hours
Set up and change electrodes (man and machine)	8 hours
Machine hours only (no operator required)	32 hours
Hand finish after E.D.M.	2 hours
<b>TOTAL</b>	<b>44 hours</b>

**Saved: 64 hours at \$7 per hour**

# elox

*corporation of michigan*

1832 Stevenson Hwy.  
Royal Oak 3, Mich.

Elox Electron Drills for removing  
broken taps, drills, etc., from \$495  
to \$3450.

### additional EDM advantages in forge die machining:

- Dies are fully heat treated prior to machining thus eliminating possible distortion.
- Resizing forging dies after washout can be done within two hours.
- Inherent workhardening values are retained in the dies since no additional re-heat treating is necessary.
- Actual die life is increased.
- Many forge die alloys are self-polishing after EDM.

This machining application is one of many time and material saving jobs being turned out by the standard Elox M-500 Electronic Machine Tool. See EDM in operation at Elox Demonstration Centers.

\*T.M. Reg.

## Can you disregard length of service and promote a junior man on the basis of a supervisor's opinion only?

### What Happened:

The company had the usual policy of promoting on the basis of length of service provided skill and ability were relatively equal. When a vacancy opened up, Charles Buckingham got the nod. He was with the company for 5 years and had an excellent record. A senior employee, Louis Furstenberg, put in a protest. "I've been here 7½ years and I should get that job," he said. When the general manager heard the complaint he called in the foreman. "I've watched these 2 fellows work for over 4 years that they've been in my department. I feel that Charlie is better qualified and will do a better job. After all, my job as a supervisor is to be able to judge people. I tell you Charlie's the man."

The general manager was convinced, and the promotion went through for the junior worker. Furstenberg appealed and the case came to arbitration.

His pitch was:

1. I am a senior employee and should get the job.

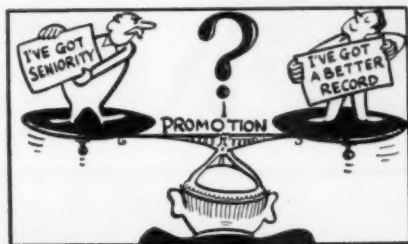
2. The company has no proof I can't do the work.
3. How about a trial period — I'll show I can do it.

### The company answered:

- We don't maintain detailed records so our "proof" has to be the supervisor's opinion.
- The supervisor is part of management and management has the right to select employees for promotion.
- We've always handled promotions on this basis and have never gone in for trial periods.

### Was The Company:

RIGHT ☐ WRONG ☐



Can you disregard length of service and promote a junior man?



# New Ideas in ABRASIVE FINISHING

TAKE ADVANTAGE of the contributions which rubber-cushioned Brightboy has made to finishing over fifteen years. PROFIT through Brightboy's continual superseding of costlier methods in more and more phases of finishing ALL METALS.

Brightboy's unique abrasive-and-rubber action has pioneered a completely new concept, wider applications, in the use of abrasives. TRY IT on your conventional, light-finishing operations. Try it on the difficult jobs. Try it on work which you think is now costing you too much, or where you think costs can be cut.

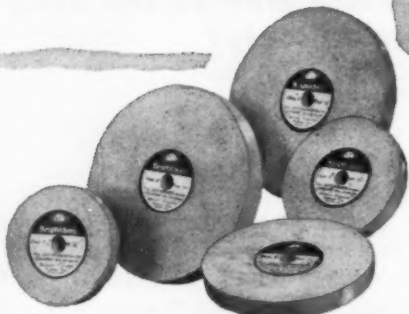
Ask your dealer to suggest Brightboy uses to you. Ask him for the new Brightboy catalog, or write us for it and get our recommendations on any situation in which finishing is involved.



Brightboy is available for QUICK DELIVERY in wheels as well as in a full range of accessory products—rods, sticks and blocks—for machine and manual operations.

## SILICON CARBIDE and ALUMINUM OXIDE GRAINS

Each in combinations of grain sizes and textures from extra fine to extra coarse, in soft, firm and tough rubber binders.



## WHAT YOU SHOULD KNOW ABOUT MULTI-USE, RUBBER-CUSHIONED BRIGHTBOY

- BURRS • FINISHES • CLEANS
- POLISHES ALL METALS — FREQUENTLY IN ONE OPERATION
- OFTEN ACHIEVES TIME-SAVINGS UP TO 50%
- BRIDGES THE GAP BETWEEN THE GRIND AND THE BUFF
- OFTEN SERVES AS THE FINAL POLISH
- STANDARD-STOCK, JOB-MATCHED GRAINS & TEXTURES  
That Do The Work of "Specials", and the usual jobs, too.
- NO BEFORE-USE PREPARATION OR DRESSING REQUIRED

## A FEW OF MANY BROAD USES

Removing light digs, tool and heat marks. Cleaning and smoothing welded and soldered joints. Burring and finishing castings, molded and machined parts.

BRIGHTBOY INDUSTRIAL DIVISION  
WELDON ROBERTS RUBBER CO.

95 NORTH 13th STREET

NEWARK 7, N.J.

America's Pioneer Manufacturer of Rubber-Bonded Abrasives



Circle No. 318 on Card, Opposite Page 65

*Another* **PUTNAM** *first!*

**STANDARD  
END MILLS FOR  
ALUMINUM**



Your local Putnam distributor carries over 1400 standard types and sizes of Putnam end mills—contact him for the best in service and quality end mills.



*Now!*

You can select a standard Putnam Hi-Speed end mill especially designed for machining aluminum and aluminum alloys.

Putnam again leads the field by making available, from stock and at standard prices, end mills for machining aluminum. These tools have been developed through years of research and experience on aluminum applications. Correct design, flutes polished all over, finest materials, and uniformity insure maximum chip removal, longer tool life, better finishes, free cutting and best all around performance.

End Mills for aluminum are offered in a range of diameters from  $\frac{1}{4}$ " to 2" in the three popular flute lengths. Other diameters and lengths can be furnished as required—prices on application.



**P U T N A M**

2981 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

## Right — Wrong

continued

### What Arbitrator Harry H. Platt Ruled:

"According to the foreman's testimony, Furstenberg was not promoted to this job because the foreman 'felt' that Buckingham could handle the job better. Such testimony, however, is not sufficient to establish a claim of greater ability in

one employee than in another. While, to be sure, a foreman's testimony as to an employee's general character, or his belief that one employee is more skillful than another is entitled to important consideration from an Arbitrator, they certainly cannot be accepted as conclusive in the absence of tangible evidence which relates to capacity to do the specific job. A foreman's beliefs even though honest are not always infallible. Furstenberg is entitled to a trial period."

## Does an employee promoted to foreman accumulate seniority?

### What Happened:

Glenn Van Nortwich was a good maintenance man, and after 10 years was promoted to the job of working foreman. But a year later business took a turn for the worse and the company was forced to lay off 50 employees. In the reshuffle of jobs, Glenn was demoted back to his former job. This meant that Hal Martin, a 7 year man had to make way for Glenn on the grounds that the ex-foreman had greater seniority. Martin filed a grievance protesting his layoff. He stated:

1. When Glenn was promoted to foreman he lost the seniority accumulated as a worker.

2. Seniority protection is for workers and not for management. Glenn, being a foreman, was a management man. When he was promoted, he "quit" being an employee, so he can't claim seniority.

The company didn't see it that way at all. In fact, it was quite indignant and told the arbitrator that if Martin's position were supported, no employee would accept a promotion to a supervisory job for fear of losing the protection of seniority in case of a downgrading.

### Was The Company:

RIGHT ☐ WRONG ☐

### What Arbitrator Harry H. Platt Ruled:

"From any logical viewpoint it would seem that an employee who quits would most naturally be expected to forfeit his seniority. But a promotion to a management job cannot be considered a 'quit' by any standard of reasoning. It is traditional with American workers to work and look forward to the day when they may gain promotion to a better job. And should such an opportunity arise, it is

Continued on page 182



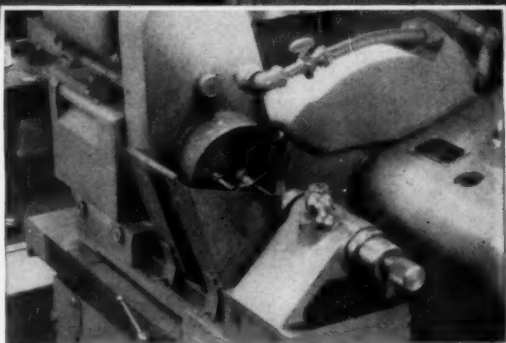
Does an employee promoted to foreman accumulate seniority?

# High Precision Production Here



**ARTER**

*Using diamond wheel to grind O.D. of a solid carbide 1/16" diameter end mill — dead center work head used.*



Twelve of a battery of twenty-four Arter Model 103 cylindrical grinders in the highly modern plant of The Atrax Company, Newington, Conn. This nationally known progressive company produces precision ground carbide tools — end mills,

reamers, drills, grinding tools, burs, bur mills, boring tools and boring bits. Atrax also has some of these versatile Arters set up for internal grinding. Whether you have external cylindrical or internal grinding, it will pay you to look into this grinder.

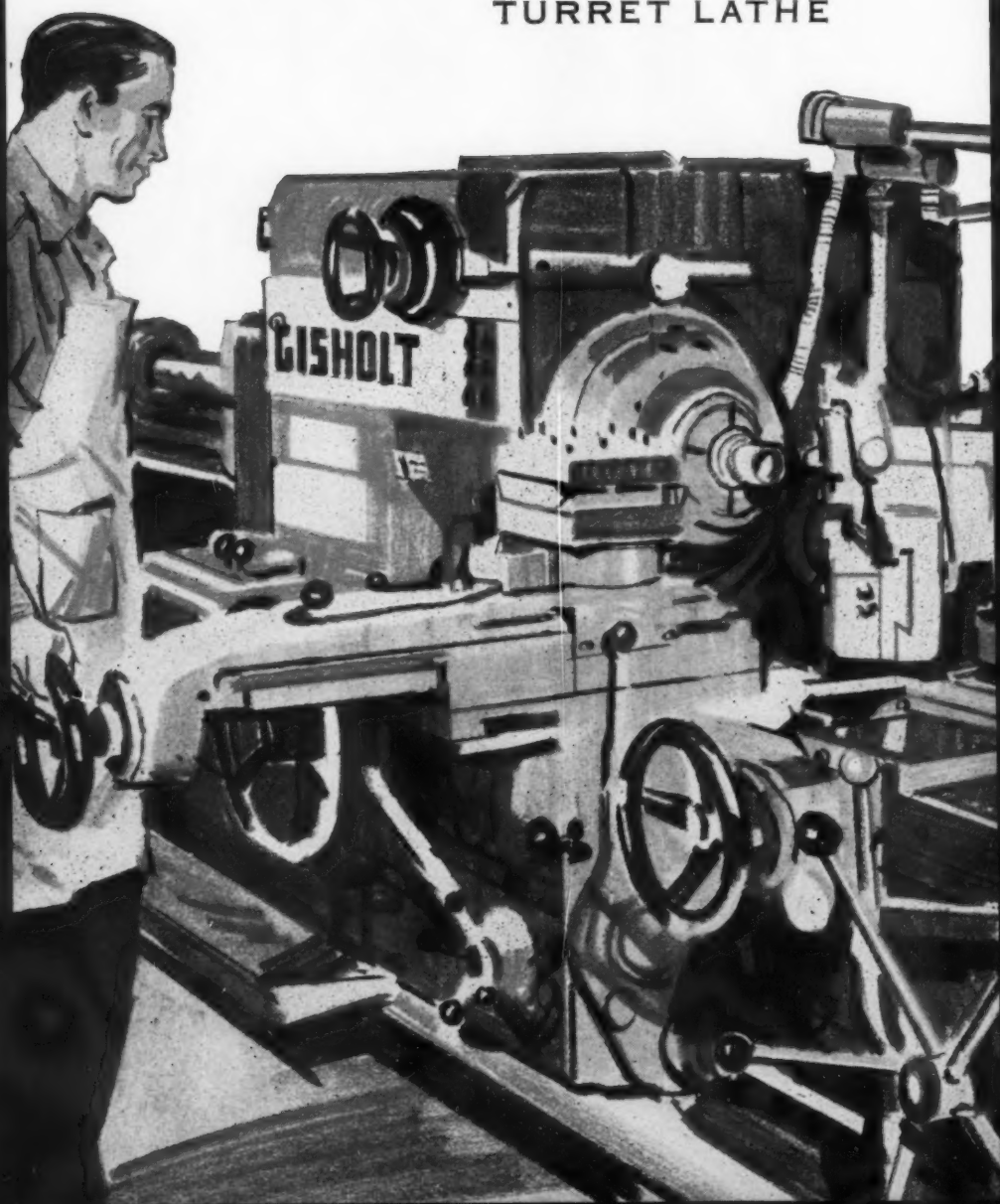
## **ARTER GRINDING MACHINE COMPANY**

**WORCESTER 5, MASSACHUSETTS**

Jigmatic Automatic Tape Controlled Positioning Table • Rotary Surface Grinders  
Flat Circular Cutter Grinders • Internal Grinders • Cylindrical Grinders • Carbide Tool Grinders  
**AGENTS IN INDUSTRIAL CENTERS OF UNITED STATES AND CANADA**

Circle No. 320 on Card, Opposite Page 65

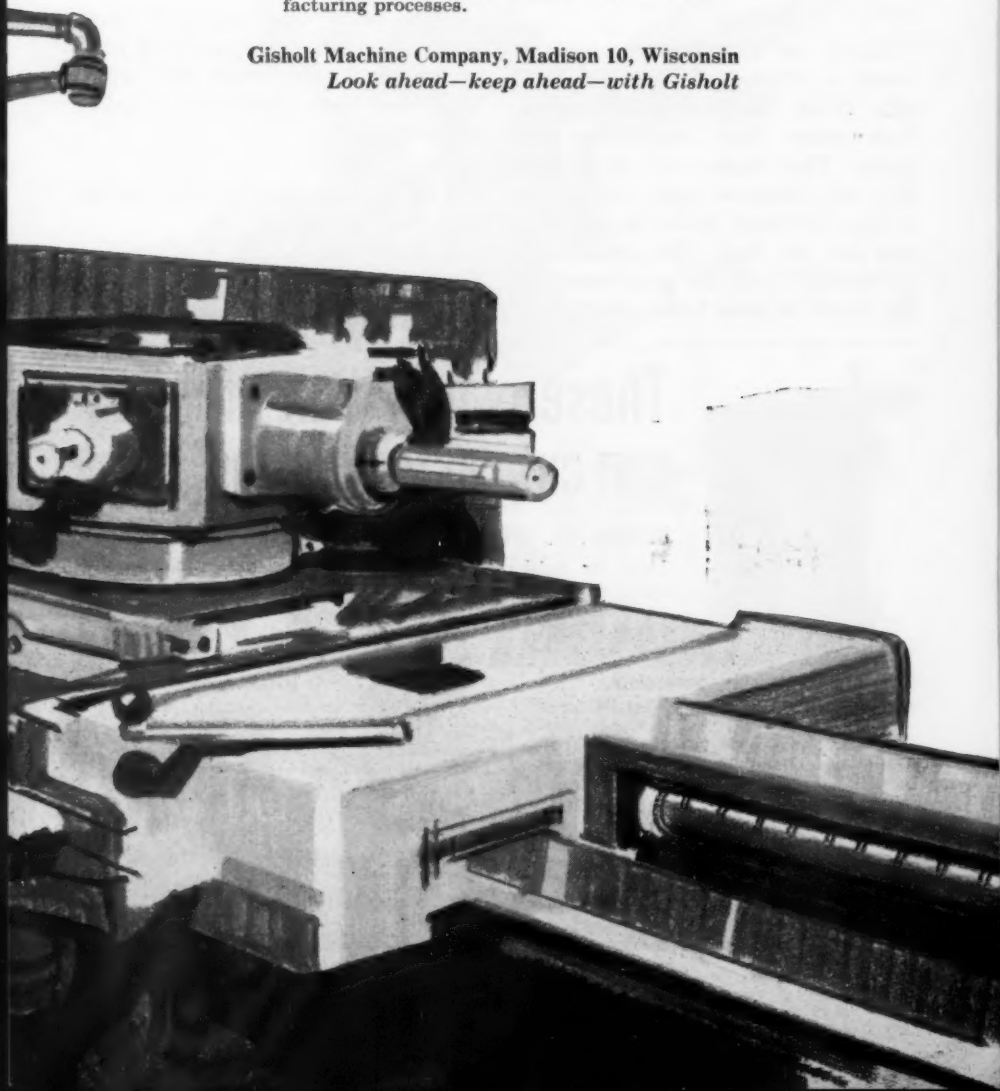
GISHOLT MASTERLINE  
SADDLE TYPE  
TURRET LATHE





Throughout the metalworking industry, Gisholt High Production Saddle Type Turret Lathes are known for simpler controls, ease of operation, wide adaptability and sturdy construction. Gisholt continues to set the pace with the new MASTERLINE series—outstanding in ability to handle rugged jobs, with ample power and massive weight to withstand deep cuts at punishing feeds without vibration. Let us tell you more about these machines—and how they can be applied profitably to your manufacturing processes.

Gisholt Machine Company, Madison 10, Wisconsin  
*Look ahead—keep ahead—with Gisholt*



Continued from page 178

understandable that employees would wish to be in a position to accept a promotion to foreman without risking a forfeiture of their long seniority. I conclude therefore that a worker who is promoted to foreman does not lose his seniority. However I am of the opinion

that an employee who is promoted to foreman does not accumulate seniority while he is in a supervisory position. Glenn Van Nortwich is entitled to 10 years seniority accumulation. The year he served as a supervisor does not count, and I so rule."

## When can't you fire employees for gambling on company property?

### What Happened:

McManus and Bradley came to work on a Saturday to do a special job. While they were waiting for instructions, they started to play poker. They knew this was against the rule because they asked one of the "kibitzers" to be on the lookout for the boss. The stakes got pretty high, and the game went on for about an hour before they were

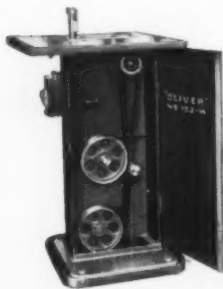
caught. Both men admitted they knew about the anti-gambling rule in the plant. Yet, when they were fired they took their case to arbitration.

They argued:

1. The rule had never before been enforced.
2. This was their first offense.

The company answered:

1. We never caught anyone be-



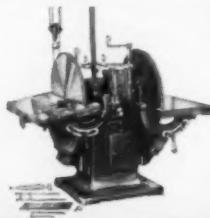
## These two OLIVER Grinders can cut costs on many jobs!

### OLIVER NO. 190-W WET GRINDER AND POLISHER

Ideal for finishing outside and inside edges of nonferrous metal castings and plastics. Whirling jet of water is sprayed on belt. This sturdy, low-cost machine quickly pays for itself.

### Disk Grinder quickly, accurately finishes nonferrous metals

Two 37½" disks. One plain table. Other has 6" vertical adjustment and is slotted for grinding circular, angular, compound shapes. Tables tilt 45°. Also 15", 20", 30" Disk Grinders. Write for bulletins.



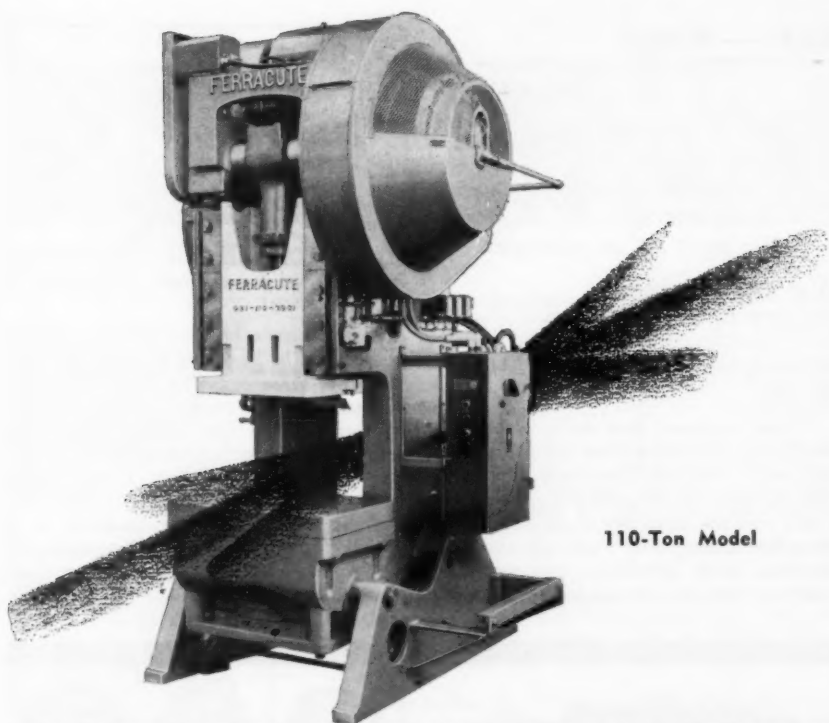
Get this folder on newest Metal Working Machines.



**OLIVER MACHINERY COMPANY**  
Established 1890

GRAND RAPIDS 2, MICHIGAN

Circle No. 322 on Card, Opposite Page 65



110-Ton Model

• AIR CLUTCH • INTERCONNECTED BRAKE • BOX TYPE RAM • AIR COUNTER  
BALANCE • DIE LIGHTING • PNEUMATIC DIE CUSHION

**ON FERRACUTE**

## ***Open-Back Inclinables***

Air clutch standard on models 110-ton, 150-ton, 200-ton. Air clutch optional on models 32-ton, 43-ton, 56-ton, 70-ton, 88-ton. Box type ram available on models 110-ton, 150-ton, 200-ton. Write for complete specification sheets on these high-production, low-cost FERRACUTE OPEN-BACK INCLINABLE PRESSES.

FERRACUTE Since 1863

**FERRACUTE MACHINE CO.**  
**BRIDGETON, NEW JERSEY, U.S.A.**

**FERRACUTE**

Manufacturers of Power Presses, Press Brakes and Special Machinery

Circle No. 323 on Card, Opposite Page 63

## Right — Wrong

continued

fore so we couldn't enforce the rule.

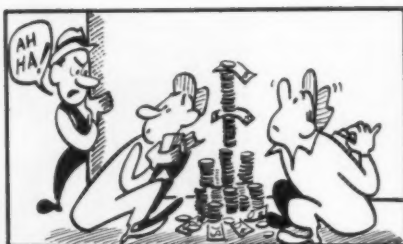
2. The workers knew they were doing wrong.
3. We must set an example.

Was The Company:

RIGHT ☐ WRONG ☐

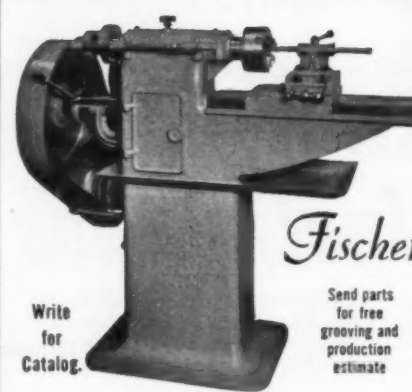
What Arbitrator Douglas B. Maggs Ruled:

"I am convinced that the workers violated, and knew that they were violating reasonable and valid company orders by playing poker for large stakes. Therefore, I rule that the company could justifiably discipline them. The evidence showed, however, that gambling on company premises had long been a common prac-



When can't you fire employees for gambling on company property?

tice. Overseers had warned against it, but no one had ever been disciplined for it. Under these circumstances, I rule that discharge is too severe a penalty. If the company wishes to discharge workers for such offenses in future, it should post notices to that effect. I rule that a 3-month's suspension without pay and without accumulation of seniority is a proper, justified, disciplinary punishment for McManus and Bradley and that their discharge is to be treated as such. • • •

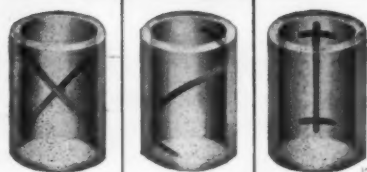


Fischer

Send parts for free grooving and production estimate

ESTABLISHED 1900

**FISCHER MACHINE CO.**  
ELEVENTH & WOOD STS. • PHILADELPHIA 7, PA.



### ... OIL GROOVERS

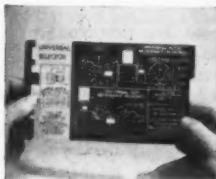
The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

# FREE LITERATURE

MACHINE AND TOOL

blue book

(see Number 1.)



**1. Drill Bushing Calculator.** A pocket-sized slide chart that instantly calculates the proper drill bushing for a given drill size has been perfected by the Universal Engineering Co., Dept. C, Frankenmuth, Mich., and is being offered to engineers who write their request on a company letterhead.

(see Number 2.)



**2. Presses.** Danly Machine Specialties, Inc., 2100 S. Laramie Ave., Chicago 50, Ill. Double action straight side presses ranging from 200-ton to 2000-ton capacity are featured. Bed-sizes up to 228" x 108" are included with complete specifications and dimensions.

**3. Cutting Tools.** Chicago-Latrobe, 411 W. Ontario St., Chicago 10, Ill. Catalog shows the complete line of tools with prices and all dimensions. Contains technical data and tools made of high speed, carbon steel and carbide and for use in steel, wood, concrete and glass.

**4. Ventilated Clutch.** Fawich Corp., 9919 Clinton Rd., Cleveland 11, O. A complete description is given for the new Fawich VC Ventrator clutch, its elements, applications, complete dimensions and capacity data.

**5. Presses.** Famco Machine Co., 3100 Sheridan Rd., Kenosha, Wis. Catalog includes data, specifications, photos and descriptions on power presses, arbor presses, air and foot presses, drill presses, band saws, and squaring shears.

(see Number 3.)



**6. Magnet Separator.** S. G. Frantz Co., Inc., Brunswick Pike and Kline Ave., P.O. Box 1138, Trenton 6, N.J. Brochure features the Frantz Ferro Filter, permanent magnet separator for the extraction of iron and steel particles and chips from circulating oils and compounds.

**7. Tool Sharpener.** Wm. H. Field Co., Inc., 325 Dorchester Ave., Boston 27, Mass. Centra-Point method which features mechanical wheel dressing, self-registering tooth rests and direct reading of clearance angles is featured.

**8. Clutches.** Formsprag Co., 23601 Hoover Rd., Van Dyke, Mich. Makers of sprag type clutches for overrunning, indexing, and backstopping have a new folder on standard clutches and clutch-coupling units.

## Free Literature

continued

**9. Swaging Machines.** The Torrington Co., Swaging Machine Div., Torrington, Conn. Literature introduces the new streamlined rotary swaging machines featuring maximum capacity, convenient control location and integral storage space.

**10. Chucks.** The Whiton Machine Co., New London, Conn. Catalog features geared scroll and independent hardened plate type chucks. These lathe chucks feature jaws which are formed by separate, hardened and ground segmental plates.

**11. Marking Machines.** Jas. H. Matthews & Co., Pittsburgh 13, Pa. Catalog contains the line of general purpose marking machines. Included are bench models, hand-operated models, full pneumatic model, and hydra-pneumatic model.

**12. Speed Reducers.** Farrel-Birmingham Co., Inc., Ansonia, Conn. Booklet contains full information about the complete line of Farrel speed reducers, which have been re-engineered, rerated and expanded.

**13. Tool and Die Steel.** Firth Sterling, Inc., 3113 Forbes St., Pittsburgh 30, Pa. Two new grade bulletins have been released on free-machining tool and die steels. Bulletins give information on analysis, characteristics, etc.

**14. Cutting Tools.** M. A. Ford Mfg. Co.,

Inc., West River St., Davenport, Ia. Catalog features Ford's complete cutting tool line including H.S.S. and carbide rotary files, cutters, etc.

**15. Horizontal Comparator.** Federal Products Corp., 1144 Eddy St., Providence 1, R.I. Two new bulletins feature the horizontal Master Comparator and the Model 130 Electronic Comparator.

**16. Switches.** General Electric Co., Schenectady 5, N.Y. Bulletin GEA-4746B covers the complete line of control and transfer switches for low voltage applications up to 600 volts ac or dc.

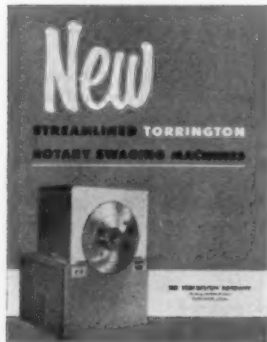
**17. Tools of Tomorrow** are featured in a new booklet from Geo. Gorton Machine Co., Racine, Wis. Included are pantographs, milling machines, duplicators, screw machines, graduating machines, grinders, small tools and accessories.

**18. Rubber Products.** Garlock Packing Co., Palmyra, N.Y. Bulletin describes the complete line of Silicone rubber products that are said to withstand both high or low temperatures.

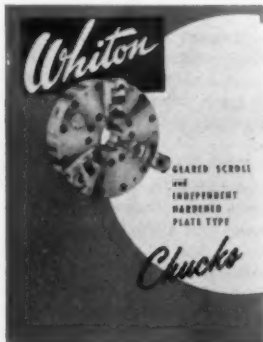
**19. Self-Tapping Inserts.** Groov-Pin Corp., Ridgefield, N.J. This self-tapping bushing, the Tap-Lok insert, is threaded inside and out and has cutting edges for installation in a drilled or cored hole.

**20. Cooling Rolls.** F. R. Gross Co., P.O. Box 2044, Akron 11, O. Bulletin describes a method of improved heat transfer in cooling rolls. It has had successful application in polyethylene laminating.

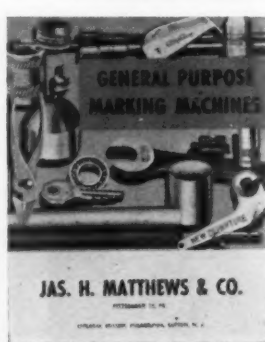
(see Number 9.)



(see Number 10.)



(see Number 11.)



## Free Literature

continued

**21. Wire Flattening.** Waterbury Farrel Foundry & Mach. Co., Waterbury, Conn. Booklet No. 731-R gives details on the wide range of 2-high wire flattening mills and auxiliary equipment.

**22. Gages.** Winter Bros. Co., Rochester, Mich. Catalog No. 2 illustrates the complete line of balanced action threaded and cylindrical plug and ring gages, and includes net prices of stock items.

**23. Holding Devices.** Heinrich Tools, Inc., 1536 Clark St., Racine, Wis. Catalog describes the complete line of holding devices including press and machine vises, fixture locks, air clamps and accessories, shears, nibblers, punchers, etc.

**24. Jig and Fixture Hardware.** Goe Engineering Co., 219 S. Mednik Ave., Los Angeles 22, Cal. Catalog features hardware for jigs and fixtures and includes prices and specifications.

**25. Dust Collector.** Green Fuel Economizer Co., Inc., Beacon, N.Y. Bulletin describes a packaged type Aerodyne dust collector designed for broad use in industry.

**26. Surface Grinder.** Graham Machine Tool Co., 19 Cleveland Place, New York 12, N.Y. Bulletin describes the Astra, 10" x 24" hydraulic surface grinding machine which is medium-size, and offers greater

grinding width and full hydraulic table.

**27. Cam Feed Drill Units.** The Hartford Special Machinery Co., 269 Homestead Ave., Hartford 12, Conn. Flyer features newly designed units with faster cycling, narrow construction and more flexibility.

**28. Chucks.** Horton Chuck Div., Windsor Locks, Conn. Catalog includes illustrations and dimensional drawings for all chucks, jaws and parts for ready identification.

**29. Pivot Polishing.** Carl Hirschmann Co., Inc., 30 Park Ave., Manhasset, N.Y. Booklet describes the process of sizing and finishing high precision shafts and pivots.

**30. Thread Milling.** Hanson-Whitney Co., Div. of Whitney Chain Co., of Hartford, Conn. Catalog describes the complete line of "threads with one turn" semi-automatic thread milling machines.

**31. Cutting Barrels.** Hartford Steel Ball Co., Inc., Hartford 6, Conn. Flyer features the new Hartford Triple Action enclosed tumbling barrels available in 10 and 4 cubic foot models.

**32. Hydraulic Fluid.** E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. Described is the new Houghto-Safe fire resistant hydraulic fluid.

**33. Corrugated Boxes.** Hinde & Dauch, Sandusky, O. Booklet titled, "How To Ship More Economically in Corrugated Boxes" is now available.

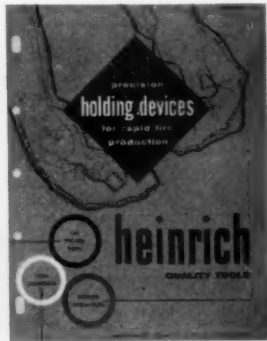
(see Number 21.)



(see Number 22.)



(see Number 23.)



## Free Literature

continued

**34. End Mills and Reamers.** R. L. Schmitt Co., Allen Park, Mich. Two new bulletins describe and illustrate the line of solid carbide end mills and solid carbide reamers.

**35. Comparators.** Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford 1, Conn. Catalog features the Air-O-Limit comparator along with the process of pneumatic gaging.

**36. Drills.** Precision Twist Drill & Mach. Co., Dept. 188, Crystal Lake, Ill. Catalog contains information about straight shank twist drills and drill blanks as small as .006 diameter.

**37. Calculating Chart.** Chas. F. Herbstreith Co., Nutley, N.J. An inexpensive plus-minus calculating chart, designed to perform the same functions as the more elaborate slide rule is described.

**38. Collets.** Hardinge Bros., Inc., Elmira, N.Y. A complete collet selection guide for all lathes, millers, grinders and fixtures is presented. Specification and dimension charts are included.

**39. Die Handler.** Hansford Mfg. Corp., 1239 University Ave., Rochester 7, N.Y. Bulletin features the line of Hansford die handlers, for the modern method of handling dies.

**40. Carbide Tool Grinders.** Hammond Machinery Builders, Inc., 1600 Douglas Ave.,

Kalamazoo, Mich. Catalog features carbide tool grinders, carbide tool and chip breaker grinders, and diamond wheel and belt finishers.

**41. Dresser for Centerless Grinder.** Hoglund Engineering & Mfg. Co., 343 Snyder Ave., Berkeley Heights, N.J. Bulletin features the Hoglund hydraulic automatic dresser for centerless grinders.

**42. High Speed Portable Grinder.** R. G. Haskins Co., 2651 W. Harrison St., Chicago 12, Ill. Bulletin features the VB2 high speed flexible shaft grinder and a complete accessory line.

**43. Grinders and Shapers.** Jersey Mfg. Co., 401 Livingston St., Elizabeth 1, N.J. Model SM3 grinding machine for small drills from 0.012 to 0.120 and the Model K150 universal shaping machine for all contours are featured in bulletins.

**44. Chuck Jaw Blanks.** Jergens Tool Specialty Co., 712 E. 163rd St., Cleveland, O. Folder gives complete specifications for 8 distinct types of chuck jaw blanks designed to fit over 90% of chucks.

**45. Tap Grinder.** Jones & Lamson Machine Co., Springfield, Vt. Flyer describes the new Hi-Production tap grinder specifically designed for high production grinding of standard taps.

**46. Shuttle-Drive Conveyors.** Industrial Filtration Co., Dept. SD-478, Lebanon, Ind. Bulletin gives complete technical details on Delpark shuttle-drive conveyors for all material handling.

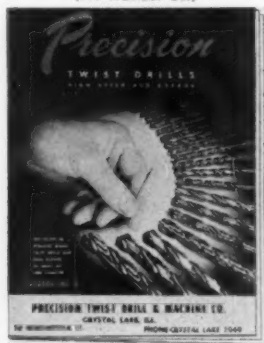
(see Number 34.)



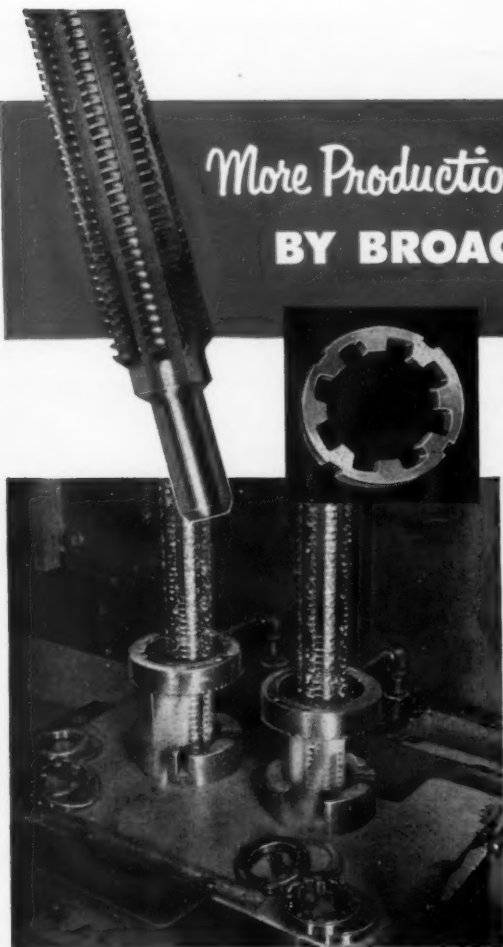
(see Number 35.)



(see Number 36.)



## More Production, More Profit BY BROACHING...



Internal broaching of a cam ring. Note the complexity of the ring design. The steel is soft and tends to tear, yet this Continental Broach sizes the I.D. and cuts 8 splines 5/16" deep in one pass.

### REMOVE STOCK TO PRECISION LIMITS—FAST ...ROUGH AND FINISH IN ONE PASS!

The scope of Broaching has broadened in recent years. Many broaching operations do precision work in far less time than other metal-cutting methods.

Continental Engineers have for years been designing all types of cutting tools and broaches. They can recommend without bias your most economical way to do the work.

For facts about increasing your production by broaching, call in your local Ex-Cell-O representative—or write Continental in Detroit for Cutting Tool Catalog.

64-99  
**Continental**

**TOOL WORKS**



DIVISION OF  
EX-CELL-O CORPORATION  
DETROIT 32, MICH.

## Free Literature

continued

**47. High Speed Indexing.** Ferguson Machine & Tool Co., P.O. Box 5841, St. Louis 21, Mo. Catalog No. 106 contains full selection and application data on their high speed indexing mechanisms.

**48. Hydraulic Power Units.** Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit 32, Mich. Bulletin describes Quill Type hydraulic power units and their use in step drilling and other machining operations.

**49. Die Casting Machine.** Cleveland Automatic Mach. Co., Cincinnati 12, O. Bulletin describes the Model 400-N that has increased rigidity and hydraulic capacity, and 400 ton locking pressure.

**50. Magnet Materials.** Indiana Steel Products Co., Valparaiso, Ind. Manual No. 5-R discusses the selection of proper magnet materials. Chart summarizes the magnetic characteristics and application.

**51. Roll-A-Way Filing System.** Inter-Lakes Engineering Co., 4845 Bellevue Ave., Detroit 7, Mich. Flyer describes method of filing large layouts, master drawings, progress charts, templates, etc.

**52. Troubleshooting and Balancing.** International Research & Development Corp., 810 Thomas Lane, Columbus, O. Literature describes the operation and application of a new troubleshooting tool and portable balancer.

**53. Vises.** Illinois Metal Products, 429 W. Superior St., Chicago, Ill. Brochure fea-

tures the versatile new IMP Hold-Down vises, along with ideas, illustrations and application photos.

**54. Ballizing.** Industrial Tectonics, Inc., 3684 Jackson Rd., Ann Arbor, Mich. Literature describes the Ballizing process for high-speed, high-precision, hole sizing and finishing.

**55. Throwaway Inserts.** Kennametal, Inc., Latrobe, Pa. Booklet B-300 features 17 throwaway insert styles. It illustrates how Kendex tooling eliminates all grinding, cuts costs per cutting edge, indexes in seconds and provides chip control.

**56. Vibration & Noise Control.** Korfund Co., Inc., 48-39 W. 32nd Pl., Long Island City 1, N.Y. Bulletin discusses machine mobility, eliminating floor bolts, leveling machines, eliminating rejects, and controlling vibration and noise.

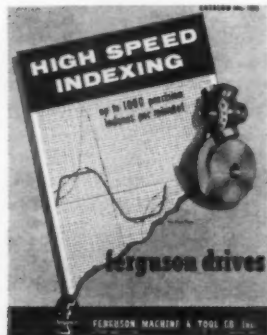
**57. Wheel Dressing Tools.** Koebel Diamond Tool Co., 9456 Grinnell, Detroit 13, Mich. Described are Koebelite wheel dressing tools made with cemented diamond particles in new metal matrix.

**58. Expanding Mandrels.** LeCount Tool Works, Inc., 390 Capitol Ave., Hartford, Conn. The LeCount Expanding Mandrel line is described and illustrated.

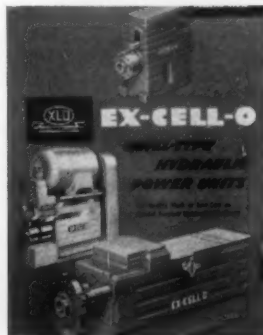
**59. Chuck Keys & Lathe Wrenches.** Lindstrom Mfg. Co., Inc., 173 Water St., New York 38, N.Y. Featured are self-ejecting safety chuck keys and lathe wrenches.

**60. Trouble-Shooting Chart for Hydraulic Systems.** is the subject for a new wall chart offered by Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.

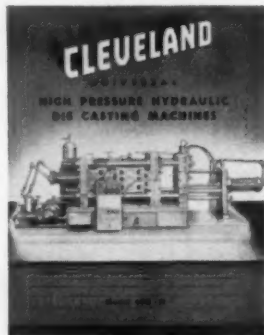
(see Number 47.)



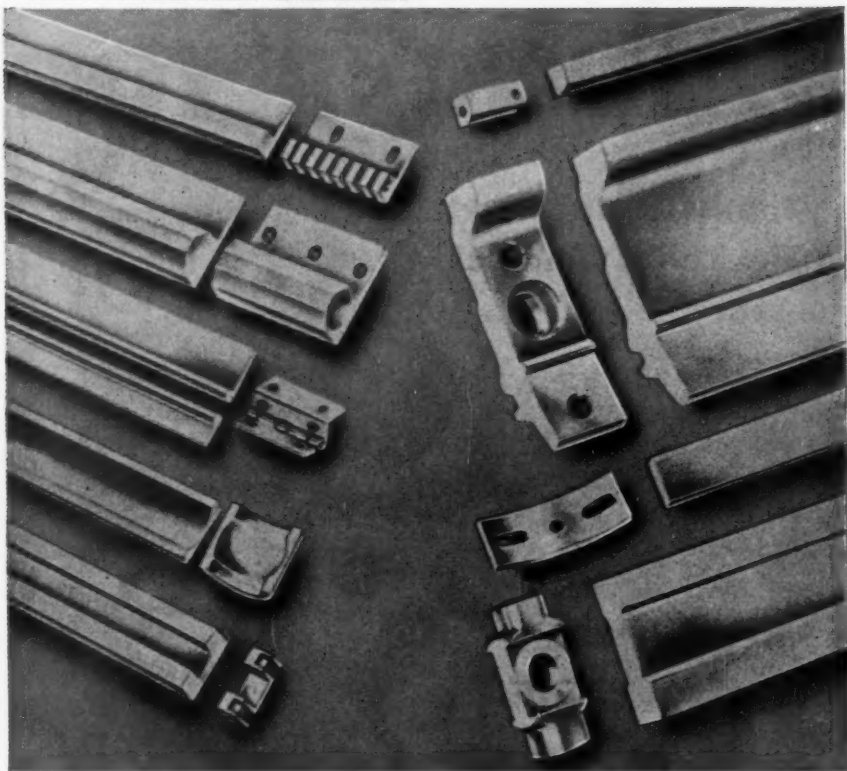
(see Number 48.)



(see Number 49.)



## A SHORT CUT TO A FINISHED PRODUCT



## REDUCE YOUR MACHINING OPERATIONS, REDUCE SCRAP get a superior wrought metal product with Anaconda extruded shapes

**Cost-saving possibilities unlimited:** In few areas can imagination and ingenuity pay off so handsomely as when applied to the use of extruded shapes. Visualize your finished parts as cross-sectional pieces cut from a long extruded shape.

**Costs come down, quality goes up:** Extruded metal is wrought metal—tough, dense-grained, smooth-surfaced, and easy to machine. When you switch from cast parts, you eliminate rejects due to pits and porosity; you reduce machining, scrap...and finishing time.

A manufacturer of hosiery knitting

machines, for example, found he saved from 25-30% over cast brass. He makes 420 components from 12 different ANACONDA Extruded and Drawn Brass Shapes. He also gets the superior precision, balance, and long-wearing and bearing qualities in these parts, which must operate at high speeds.

**Metals:** Extruded shapes are available in copper, brass, bronze, and special copper alloys—in long mill lengths suitable for feeding into turret lathes or automatic screw machines.

**Our experience at your service:** The American Brass Company pioneered in

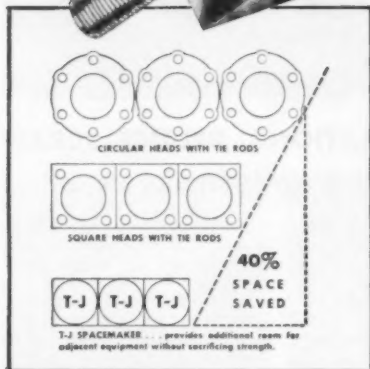
extruded shapes. The accumulated experience of the organization, its wide selection of dies, may help you short-cut production and save money.

We'll be glad to make suggestions based on your sketch or sample. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

**ANACONDA®**  
EXTRUDED SHAPES

# Saves 40% Space! **STRONGER, TOO**

Than Outmoded  
Tie Rod Cylinders!



**NEW LITERATURE . . . send today  
for new Bulletin with complete  
details of Spacemaker line.**

## Only **T-J** **Spacemaker CYLINDERS**

**Offer All The Extras As Standard!**

- **NEW** exclusive Ingenious Cushion Designs . . . Super Cushion Flexible Seals for Air . . . New Self-Aligning Master Oil Cushion
- Compact design eliminates tie rods, saves up to 40% space
- Proven Performance . . . with Extra High Safety Factor
- Hard Chrome Plated Bodies and Piston Rods (Standard, at no extra cost).
- OIL pressure to 750—AIR to 200 P.S.I.

You'll find many answers to *automation* in your plant with T-J Spacemaker Cylinders! Designed with years-ahead features for top performance and dependability. Wide range of styles, capacities . . . for all kinds of push-pull-lift operations . . . reduces man-hours and costs! Write The Tomkins-Johnson Co., Jackson, Mich.

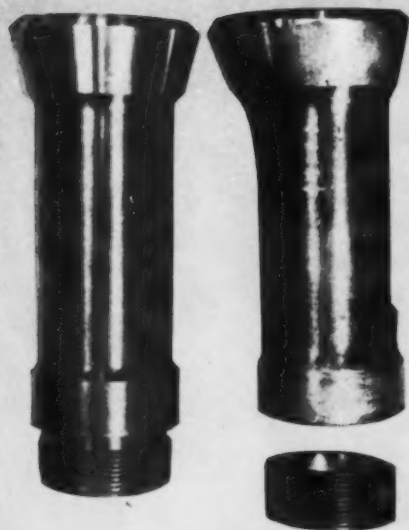
MEMBER OF THE NATIONAL FLUID POWER ASSOCIATION

**T-J**  
**TOMKINS-JOHNSON**  
DIVISIONS: AIR AND HYDRAULIC CYLINDERS, CUSHIONS, CUSHIONERS

Circle No. 327 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

# BENCO COLLETS



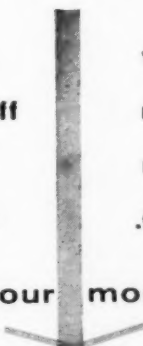
At right is a collet from a 1" machine. Note the threads are twisted off. Think about the trouble this caused besides the loss of time and production.

This will not happen to the Benco Collet shown at left. It's correctly engineered and carefully made. Remember Benco Collets are guaranteed against breakage for one year.

will not  
break off  
at the  
threads

will not  
run out  
more than  
.001 per inch

or your money back



Tests prove that the unique design of Benco Collets and our specialized manufacturing processes prevent two most common causes of collet trouble. Benco Collets are guaranteed against breakage for one year.

Benco Collets have threads with a tensile strength in excess of 175,000 pounds per square inch. These collets are made of high carbon alloy tool steel, not carburized steel. Precise manufacturing controls insure a guaranteed accuracy of .001 run-out per inch of bar extension from the face of the collet.

Even with all their extra features and guarantee, Benco Collets cost you no more than just ordinary collets. You get maximum satisfaction... you save time, money and grief by using Benco Collets. Select them every time, you can't get better quality, performance or value.



**BENCO MAKES:** Master Pushers and Pads • Master Collets and Pads • Pushers and Feed Fingers • Conventional Collets • Ejector Collets • Collet Sleeves and Chuck Nuts for B. & S. Machines • Carbide Faced Stock Stops for B. & S. Machines.

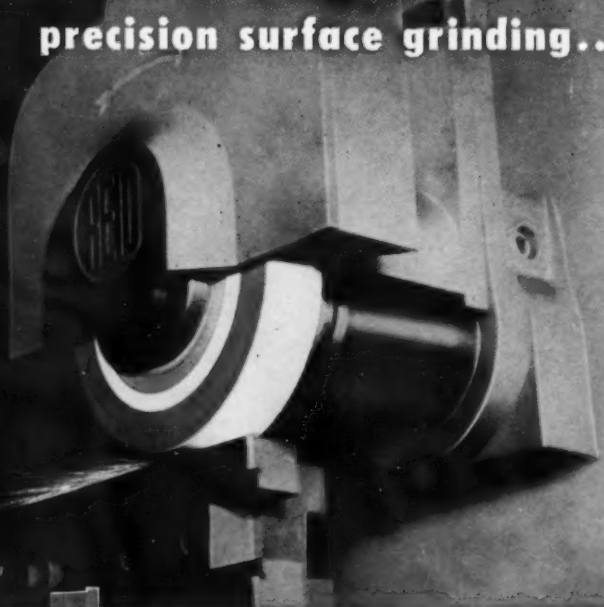
## BENCO

## COLLET MANUFACTURING CO.

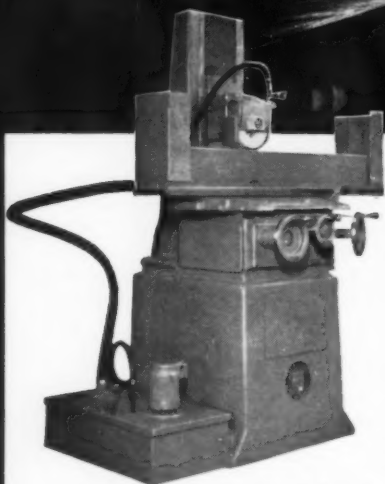
Cleveland 14, Ohio

**REPRESENTATIVES:** Dorow Machine Tools, Wichita, Kansas; Harry Dunn Corp., Houston, Texas; J. K. Bousum Co., Detroit, Michigan; Walter J. Greenleaf Co., Pittsburgh and Erie, Pennsylvania; Hospelhorn Tool & Supply Co., Dayton, Ohio; Kel-Sir Co., Milwaukee, Wisc.; Fred J. McMillen, Providence, R.I.; Philadelphia Tool Co., Bala-Cynwyd, Pa.; Pearse-Dengel Tool Co., Hasbrouck Heights, N.J.; Frank M. Wilson, Buffalo, N.Y.; W. C. Straub, Cleveland, Ohio; G. W. Wittlinger, Chicago, Illinois; J. E. Dilworth Co., Memphis, Tenn.; H. M. Scherling, Minneapolis, Minnesota; H. F. Soderling Co., Seattle, Washington; Mason Machine Tool Co., Salt Lake City, Utah and Denver, Colorado; General Foundry & Mach. Co., Sanford, N.C.; Bowen Conn, Fort Wayne, Ind.; Production Tools, Toronto, Ont.

# REID sets the standard for precision surface grinding...



*Photo courtesy of  
Robertson Mfg. Co.*



**MODEL 618H** convenient finger-tip level controls for all operations make this grinder the favorite of the toolroom for the finest tool and die grinding. Accessories, including Cool-Grind or wet grinding attachments, magnetic chucks and form dressers give extreme versatility for all operations.

**MODEL 618VL** designed for precision grinding to the finest tolerances with superior surface finish . . . rugged construction and painstaking finishing give true dependability for continuous operation with minimum maintenance. Features power feed table with traverse speed variable from 12 to 35 feet per minute.

## SPECIFICATIONS

**CAPACITY:** 6" wide, 18" long, 17 $\frac{1}{4}$ " high from spindle center to table.

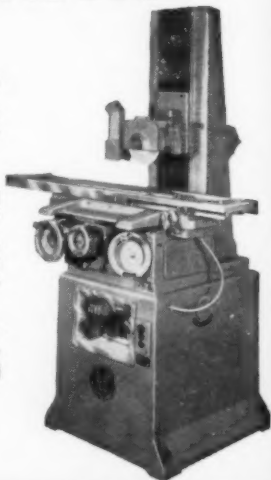
**WORKTABLE:** 51" x 8" overall.

**FEED RANGE:** Elevating hand wheel (r.) graduated to .0005" (optional, vernier to .0001"); cross feed to .001"; power cross feed adjustable .006" to .100" at either or both ends of table reverse.

**GRINDING HEAD:** with 3" opening for standard 1 h.p. cartridge type motorized spindle. Wheel size: 7" x  $\frac{1}{2}$ " x 1 $\frac{1}{4}$ ".

**FLOOR SPACE:** 71" x 43 $\frac{1}{2}$ ".

**WEIGHT:** 2100 lbs. net.



Write for Bulletin 618-6

**Reid Brothers**



**Company, Inc.**

BEVERLY

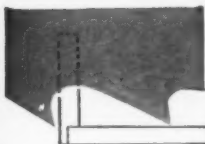
MASSACHUSETTS

# NEW *Hook-Tooth*

## LENOX HOOK-TOOTH BAND SAW BLADES

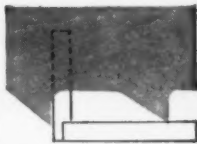
With Positive Rake and Rounded Gullets  
Cuts Faster, Freer . . . Lasts Longer  
For Non-ferrous Metals, Wood, Plastics

Hook-Tooth



Hook-Tooth Blade with a *positive rake*. Teeth hook themselves into the work. They saw in—instead of scraping and they cut full helical chips.

Conventional Blade



### Cuts Faster

The positive rake teeth incline toward the work for quicker penetration and faster cutting.

### Cuts Freer

Hook-Tooth digs in and takes big full chips from the material. Rounded gullets allow the chips to form and clear with ease.

### Lasts Longer

Hook-Tooth meets less resistance, generates less friction and heat. So, Hook-Tooth lasts longer and gives more cuts per blade.

### Costs Less

Anyway you look at it—in terms of greater production, lower blade costs, less man-hours, fewer machines—it all adds up to real savings with LENOX Hook-Tooth Band Saw Blades.

AMERICAN SAW & MFG. COMPANY  
SPRINGFIELD, MASS.

# Natco

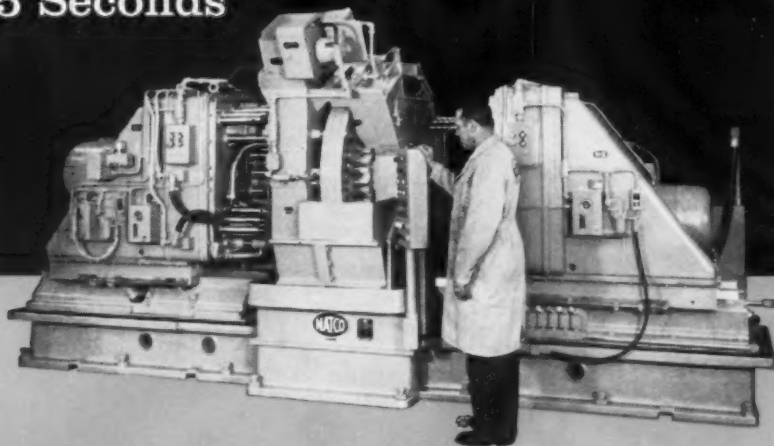
## HOLESTEEL®

### Performs

### 17 Operations

### Every

### 15 Seconds



#### **Performance**—this

Natco 2-way horizontal drilling machine produces 250 steering knuckles per hour. Holds limits as close as .004". Parts are clamped automatically in the interlocked trunnion fixture—spot-drilled, drilled, spotfaced, reamed and counterbored.

**Features**—Automatic time delay reverse, positive stop, coolant system with magnetic chip separator, automatic lubrication to heads and ways, hydraulic feed and J. I. C. compliance. Let a Natco field engineer help you with your drilling, boring, facing and tapping problems.



*Ask for information about the PAYD (Pay-As-You-Depreciate) finance plan.*

**NATIONAL AUTOMATIC TOOL COMPANY, INC.**  
*Richmond, Indiana*



Call Natco offices in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles; distributors in other cities.

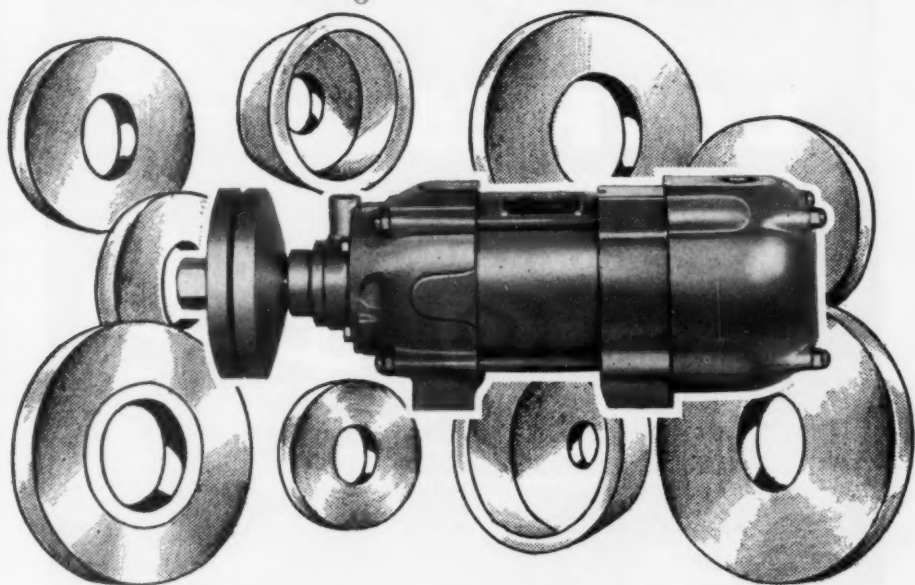
*Multiple-spindle drilling, boring, facing and tapping machines  
Special machines for automatic production*

*Serving the Industry Since 1852*



# **POSITIVE POWER**

with a **WOODS MOTOR ARBOR**<sup>®</sup>



Rugged as a block of New England granite—smooth running as a Kentucky Derby winner—operates at a cost to win the approval of any Scotchman. This description applies to any WOODS Motor Arbor.

Precision built and "tape insulated," WOODS motors are available in a wide variety of types and range from one to one hundred horsepower. Extremely adaptable for use requiring precision balance, a minimum of space and delivering the maximum of power. Why not investigate the advantages of these time-and-money saving motor arbors for your plant today?

*Send for descriptive material*

**MOTOR DIVISION**

**S. A. WOODS MACHINE CO.**  
27<sup>®</sup> DAMRELL STREET  
**BOSTON 27, MASS.**

Circle No. 328 on Card, Opposite Page 65



# LATHES

outstanding  
in **3** great  
requirements

which are indispensable in  
furnishing amazing speeds on  
work of utmost precision ...  
LOWEST COST PER PIECE.

**① GREATER RIGIDITY**

**② SIMPLICITY of CONTROL**

**and OPERATOR CONVENIENCE**

**③ PRODUCTIVITY**

**NEW**

... PRACTICAL ... DEPENDABLE ... DESIGNED  
to do MORE for you at LESS COST. Built on the fundamental SIDNEY  
principles which have won international fame  
since 1904 ... improved to satisfy

the demand of the present

and far into the future.



SIDNEY MODEL 32 ENGINE OR TOOL ROOM LATHE  
EQUIPPED WITH SIDNEY FLUID TRACER

**THE SIDNEY MACHINE TOOL CO. • SIDNEY, OHIO**

*Builders of Precision Machinery since 1904*

Circle No. 329 on Card, Opposite Page 63

## U. of C. Celebrates 50th Anniversary of Co-operative Education

Fifty years of reciprocity between education and industry were commemorated April 21-25 on the campus of the University of Cincinnati. In 1906, the late Dean Herman Schneider founded at the school a revolutionary type of business training, "Co-operative Education," an integrated program of classroom study and related practical work experience. Students alternate seven-week periods of learning theory on campus with equal periods of application in their field. By the end of their five-year program, they have gathered more than the required amount of practical knowledge necessary to start full-time jobs without long break-in or training periods.

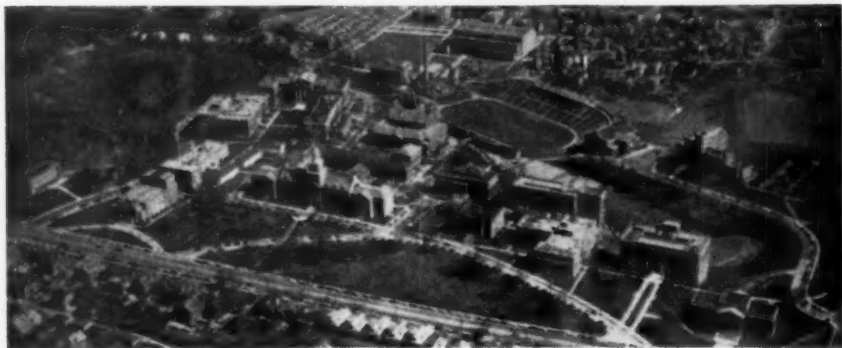
Dr. Schneider conceived the co-operative system from his own years of hard work. As an undergraduate at Lehigh University, he found that his practical on-the-job experience with an architect

permitted him to grasp his theoretical work at the University more quickly than other students.

In 1906, 27 young men at Cincinnati University started on the world's first co-operative educational program. They were students of mechanical, electrical and chemical engineering. Twelve firms, considered "brave" for their pioneering spirit, employed the students.

The plan quickly spread through the entire College of Engineering, and later was extended to the Colleges of Business Administration and Applied Arts. Today, at the University, there are more than 3000 co-operative students. They are employed by some 600 companies, located in 12 states. The majority of students stay with their co-operative firms after graduation, although there is nothing binding between them and their employers. Since its introduction at the University of Cincinnati, the co-

Aerial View of U.C. Campus.



operative plan has been adopted by nearly 40 other institutions in the United States and others abroad.

The companies which participate with the University by employing co-operative students were invited to share in the planning and participation of the observance of this anniversary. A conference and exhibition were held, having as their theme, "Education and Industry at Work for Progress." The exhibition, called the "Panorama of Industrial and Scientific Development 1906-1956," emphasized the amazing industrial progress of the past half century.

As a tribute to the founder of co-operative education, the Herman Schneider Quadrangle on the campus was formally dedicated on the opening day of the festivities.

### **Panorama of Progress**

Educational exhibits from more than 75 corporations were arranged in the Panorama of Progress at the University's Field House. Exhibitors included companies in such fields as machine tools, steel, aviation, petroleum, household appliances, utilities, farm equipment, chemical, automobiles and railroads.

Most of the exhibits were created for this occasion, especially to tell the story of education-industry cooperation. Two stage shows were presented: "Fifty Thousand Hands" demonstrated how a machine is taught to add, subtract and remember; "Previews of Progress" included demonstrations of jet propulsion, microwaves that go through the air at the rate of ten billion a second, and the manufacture of synthetic rubber.

### **Sponsors and Speakers**

Session sponsors were: Frederick V. Geier, president, Cincinnati Milling Machine Co., chairman of the National Sponsoring Committee; Stanley C. Allyn, president, National Cash Register Co.; Charles R. Hook, chairman, Armco

Steel Corp.; Henning W. Prentis, Jr., chairman, Armstrong Cork Co.; Cyrus R. Osborn, vice-president, General Motors Corp., who sponsored the Panorama of Progress exhibition.

• • •

### **Herbert Segal speaks to machinery dealers**

The machine tool industry is the backbone of the nation's peacetime economy and of its defense system and should be helped in every way possible by the United States Government to keep its equipment up-to-date, declares Herbert I. Segal, president of Van Norman Industries, Inc.

Speaking before the New England and Middle Atlantic Divisions of the Machinery Dealers National Association, Segal said that it was imperative that the Government encourage users of machine tools to modernize their present equipment and to replace, on a continuing basis, any such machine that is over 10 years old. Thus, should another international crisis arise, such as the Korean episode, the country would not find it necessary to utilize machine tools for the production of other machine tools but could use them to produce the actual end products needed for the Armed Forces.

The Federal Government, Segal told the group, as the world's largest single user of machine tools, should be the leader in this program for modernization and should be the first to modernize all of its own machine tools that are over 10 years old. The country must not be caught again, he said, with an economy dependent upon obsolete tools.

Stockpiling is not enough, Segal pointed out, since it merely means idle machines. This represents a waste of capital and worse, as idle machines deteriorate faster than those that are being put to use.

Liberalization of Federal tax laws

# Norgren

## MICRO-FOG

Model 33AF-16

Lubro-Control Unit

One lubricator completely lubricates the machine—provides better lubrication—results in quicker, easier maintenance.

### THE LATEST ADVANCEMENT IN CENTRALIZED LUBRICATION for up to 1000 bearing inches\*

**for BEARINGS,  
GEARS, CHAINS, CAMS, SLIDES,  
WAYS, Other Machine Components**

#### **AUTOMATIC MICRO-FOG LUBRICATION—**

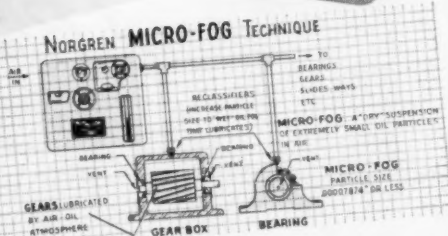
The 33AF-16 Unit automatically creates a finely divided air-borne oil fog which can be uniformly distributed through complex piping systems to multiple lubrication points.

**LARGE LUBRICATING CAPACITY—**A single unit can completely lubricate even the largest machines—up to 1000 bearing inches.

**AUTOMATIC ALARM CONTROLS—**Two pressure switches and a float-controlled switch are provided to automatically actuate an alarm system or controls when air pressure falls, when excessive pressure develops in the oil reservoir, or when the oil supply needs replenishing.

**COMPACT, COMPLETE UNIT—**Although only 12" x 11" x 9" in size, this lubricator contains all necessary controls plus a 2-gallon oil reservoir—enough oil for 12 hours lubrication at maximum MICRO-FOG output.

**AUTOMATIC DRAIN FILTER—**Protects entire equipment from abrasive and corrosive air line contaminants. Drains collected liquids automatically.



**PRESSURE REGULATOR—**Accurately regulates air pressure for most efficient lubrication.

**VISUAL OIL FEED—**Oil feed dome on front of unit provides a quick visual indication of proper operation of lubricator.

**TWO AIR SUPPLY INLETS—**Both are 1/2". One is at left side, one in back of unit. The most convenient inlet can be used.

**FOUR MICRO-FOG OUTLETS—**Three outlets are 1 1/4", one is 2" with a female tapered thread. One or more may be used.

**AUXILIARY AIR TAKE-OFF—**A 1/8" takeoff is provided in top of unit to supply air for pressure jet reclassifiers if required.

**SOLENOID VALVE—**Coordinates operation of the lubricator with starting and stopping of machine.

**TWO ELECTRICAL INLETS—**For 3/4" conduit—conveniently located at left end and at back of unit lead to splash-proof terminal compartment. Either or both may be used.



3438 So. Elati St., Englewood, Colo. 80155

\*For complete data on Norgren MICRO-FOG 33AF-16 Lubro-Control Unit, call your nearby Norgren Representative listed in your telephone directory—or **WRITE THE FACTORY FOR BULLETIN 531.**

*Pioneer and Leader in Oil-Fog Lubrication Since 1930*

Circle No. 330 on Card, Opposite Page 65

to give wider latitude to users of machine tools was recommended by Segal. He told the group that these users should be permitted to establish their own, but consistent policies for depreciation and obsolescence write-offs, whether on a 10-year, 5-year or even a one-year basis. The loss to the Government in taxes, he said, could be tempered by a change in capital asset regulations to provide that, in the sale of capital equipment which has been

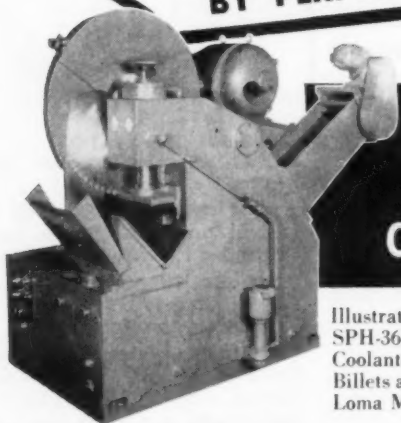
written off in less than 5 years, any profit would be considered ordinary income rather than a long term capital gain.

• • •

The Nelco Tool Co. of Manchester, Conn., manufacturer of carbide tipped tools, has announced the appointment of the F. Hallock Co., 116 Main St., Derby, Conn., as the authorized distributor of Nelco carbide tools in the New Haven area.

# Proved Better

## BY PERFORMANCE



### Ruthman Gusher Coolant Pumps

Illustrated is a Loma Saw SPH-36 equipped with a Gusher Coolant Pump and arranged for Billets and Slabs. Courtesy of the Loma Mach. Mfg. Co., Inc.

The year in and year out popularity of Ruthman Gusher Coolant Pumps with the leading machine tool builders is ample proof of their outstanding performance.

Gusher Coolant Pumps give you split second coolant flow — require no priming. Their sturdy construction, pre-lubricated ball bearings, electronically balanced rotating assembly assure you of long trouble-free life with minimum maintenance.

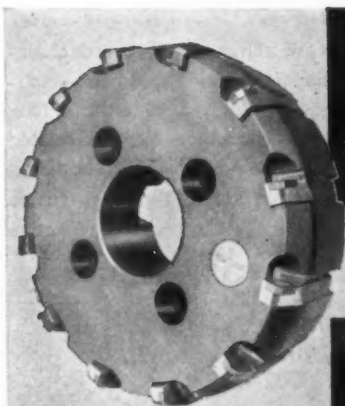


## THE RUTHMAN MACHINERY CO.

1816 READING ROAD

CINCINNATI, OHIO

Circle No. 331 on Card, Opposite Page 63



Where heavy cuts are the rule, Kroslok performs long and profitably.

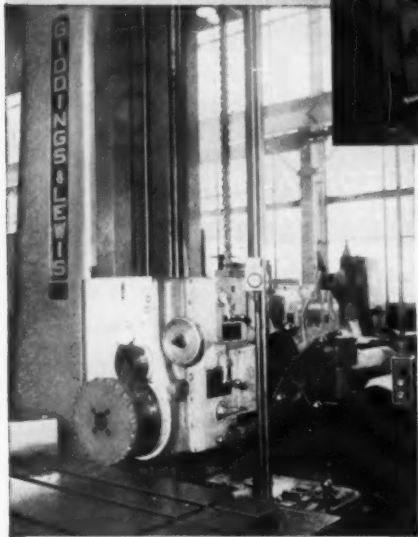
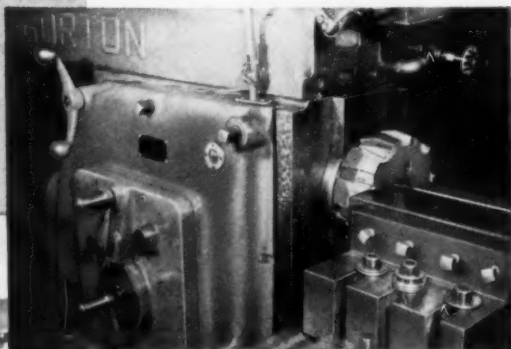
# KROSLOK<sup>®</sup> MILLING CUTTERS

GROUP IMPORTANT CONCEPTS  
FOR *Higher Production*

TOP FEEDS  
AND SPEEDS

**RUGGED  
RIGID**

ONLY 3  
MEMBERS



Production milling requires "tops" in production tools.

Production milling realizes a new high with Kroslok face milling cutters and shell end mills. Simplicity of design (only three members), extreme ruggedness and rigidity, merit your thorough investigation. Kroslok is available in general purpose and heavy duty types for ferrous or non-ferrous metals, with both fine tooth and extra fine tooth variations, in diameters from 3" through 24". May we suit Kroslok's advantages to your job?

**THE  
MOTCH & MERRYWEATHER  
MACHINERY CO.**

CUTTING TOOL MANUFACTURING DIVISION  
CLEVELAND 17, OHIO

Stocking Dealers in All Industrial Centers

TRIPLE-CHIP CIRCULAR SEGMENTAL AND SOLID CUT-OFF BLADES • TRIPLE-CHIP  
SLITTING SAWS • TRIPLE C GRINDING COOLANT • TRIPLE-CHIP SOLUBLE OIL

### **W. M. Reed**

W. M. Reed, 63, founder and chairman of the board of the American Air Filter Co., Inc., died at his winter home in Ft. Lauderdale, Fla., recently. He was the victim of a heart attack.

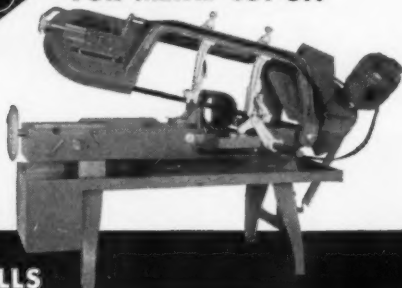
Two months ago Reed moved from the presidency of AAF to the newly created post of chairman of the board and retired from active direction of the company.

### **Robert W. Thomas**

Robert W. Thomas, 65, board chairman of the McCrosky Tool Corp., Meadville, Pa., died March 26 after a long illness. Mr. Thomas had been associated with the company since 1924, including 12 years as president. He was a trustee of Allegheny College, and was active in the Metal Cutting Institute.



#### **A NEW PRODUCTION TOOL FOR METAL CUT-OFF**



### **THE WELLS MODEL 1000 HORIZONTAL METAL CUTTING BAND SAW**

Here's the newest in the Wells quality line of metal cutting band saws—The Model 1000, a 10" capacity production machine powered by a  $\frac{3}{4}$  H.P. motor. It offers the structural rigidity necessary for better cutting and operation and utilizes a 1" blade to further assure accuracy and efficiency.

The Model 1000 also features the exclusive Wells "constant load" blade tensioning device, four selective speeds, hydraulic frame check and optional wet cutting system.

See your Wells Distributor, or write for full details.



#### *The Pioneers of Horizontal* **METAL CUTTING BAND SAWS**

WELLS MANUFACTURING CORPORATION  
707 COOLIDGE AVE. - THREE RIVERS, MICH.

Circle No. 333 on Card, Opposite Page 65

FOUND WHERE FINE BUSINESS MACHINES ARE "BORN"

## GRAND RAPIDS GRINDERS

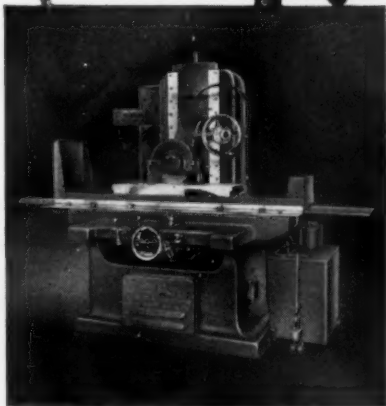


### INTERNATIONAL BUSINESS MACHINES

Producing an intricate business machine requires exceptional toolroom precision. That's why these manufacturers use Grand Rapids Grinders... engineered to achieve extraordinary grinding precision at cost-cutting speed.

Model No. 55, at right, offers such features as one-piece column and base for permanent, vibrationless alignment, wheel head with powered rapid vertical travel, hydraulically actuated cross feed and longitudinal travel table. And it's the fastest grinder of its size and type, with a variable table speed up to 125 fpm!

Whether you make business machines or bulldozers, you can count on Grand Rapids Grinders for maximum toolroom precision.



GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER. Table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head is 18". Preloaded ball bearing spindle greased for life. Spindle speed 1925 and 2500 rpm.



SMITH CORONA



COMPTOMETER



REMINGTON RAND



UNDERWOOD



C. ALLEN



GALLMEYER & LIVINGSTON COMPANY

405 Straight Ave., S.W., Grand Rapids, Michigan

A note on your letterhead will bring complete details.

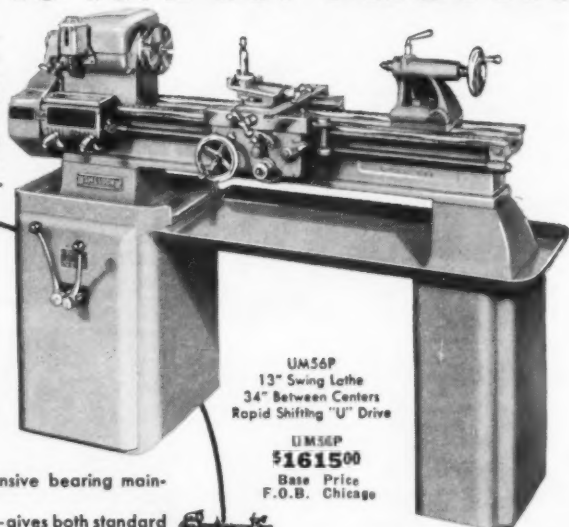


# SHELDON

CHICAGO U. S. A.

**BUILT**  
• • • to Turn out **PROFITS**

Sheldon Lathes are designed and built to do accurate lathe work rapidly and profitably. Moderate in price they have the collet, swing and power capacity to do most toolroom work.



UM56P  
13" Swing Lathe  
34" Between Centers  
Rapid Shifting "U" Drive

UM56P  
**\$1615.00**  
Base Price  
F.O.B. Chicago

## Design

### Features:

- Large and wide "Zero Precision" Tapered Roller Spindle Bearings—permit operation at all speeds, retain accuracy, end expensive bearing maintenance costs.
- 54-pitch Gear Box—gives both standard and many hard to get thread ratios.
- Large Micrometer Dials—Make accurate operation easier.
- Extra Collet Capacity—1 3/4" hole through spindles available on 10", 11" and 13" swing lathes.
- More Power to Spindle—Efficient drives with bigger motors and double neoprene V-belts to spindle.

### OPTIONAL FEATURES AT EXTRA COST

include: Hardened ways, Long Tapered Key Drive Spindles, 4" D1 Camlock Spindles bed turrets, collet attachments, and other production and toolroom accessories. Lathes available with a choice of "Bench," "Cabinet" or "Pedestal" mountings.

Write for New Catalog G-55

## SHELDON MACHINE CO., Inc.

4242 N. Knox Ave.

Chicago 41, Illinois



## WHAT'S NEW IN METALWORKING

MACHINE AND TOOL

blue book

Edited by D. M. Carlson

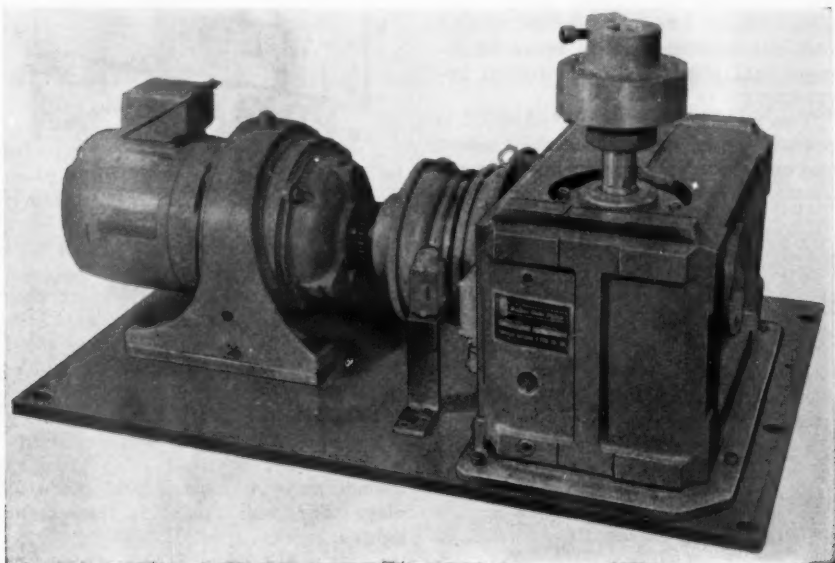
### Standard Packaged Power Unit For High Speed Indexing

A completely assembled power-indexing unit for straight line transfer machines or other indexing equipment is available from Ferguson Machine & Tool Co., Roller Gear Div., P.O. Box 5841, St. Louis, Missouri.

This "Trans-Pac" unit includes gear-motor, control shaft drive sprockets, brake actuating cam and micro-switch, electric clutch-brake combination and mounting ring, indexing mechanism and drive shaft coupling. Components,

mounted on a steel base plate, are ready for inclusion in a machine and only require necessary connections to control panel and driven parts of the machine.

The indexing mechanism, a Ferguson Roller Gear Drive, features modified trapezoid acceleration characteristics (initial force of zero and a gradual increase to maximum acceleration value) to provide smooth vibration-free indexing. It is rated for a minimum of 8000



hours operation without maintenance; has zero backlash and an accuracy of .001". An electric clutch-brake combination provides remote control of dwell and permits jogging and inching of machine elements with maximum speed and design flexibility.

Use ACTION Card, opposite page 64. Circle No. 81

## Electronic control

The Myke-A-Trol electronic control removes the element of human error from many manufacturing operations, by controlling quality during the actual processing.

Sensing elements are built into the gage heads for automatic measuring applications such as gaging and sorting, weighing, pressure control, fatigue testing, inspection, and thickness control.

System has an overall accuracy of 2% using standard transducers. Linear full scale displacement ranges of plus or minus .1 inch to plus or minus 100 microinches is incorporated in 20 scale divisions. Larger displacement ranges are available on special order. Any phenomenon, such as pressure, weight, etc., can be measured in terms of dimensional change, and controlled accordingly.

Two power relays can be adjusted to operate at any desired control point, and on any of the four sensitivity ranges. These relays can be made to operate on



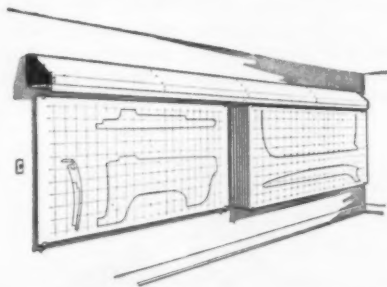
plus or minus tolerances; two successive plus tolerances; or, two successive minus tolerances, by internal switching. Industrial Electronics, Inc., Dept. JS, 8060 Wheeler St., Detroit, Mich.

Use ACTION Card, opposite page 64. Circle No. 82

## Filing systems for large layouts

A device to facilitate the filing of large layouts so as to make them readily accessible has recently been placed on the market by the Inter-Lakes Engineering Co., Dept. JS, 4845 Bellevue Ave., Detroit 7, Mich.

The "Roll-A-Way" filing system consists of a rack with a number of parallel tracks from which the layouts are suspended by means of roll hangers. The rack being twice the length of the layouts or drawings, the one desired can



be quickly rolled from its filing place to the other end of the rack where it is out in full view.

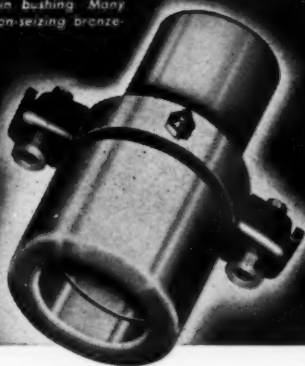
Standard racks come in various sizes and have 8 tracks. Racks can be built to accommodate any specified number of tracks, which are spaced one inch or more apart to provide ample room for both thin and thick layouts. The rack may be of any length required by the size of the layouts and may be either attached to the wall or mounted on caster-equipped standards so that it may be moved from place to place. The wall model is fluorescent lighted.

Use ACTION Card, opposite page 64. Circle No. 83

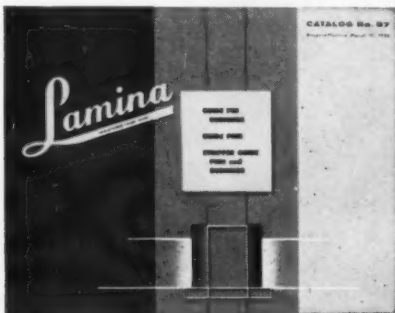
# SEE THESE *New* GUIDE PIN BUSHINGS...

**SHORT SHOULDER TYPE**—For special applications. Available in non-seizing bronze-plated hardened steel or solid Ampco bronze.

**LONG SHOULDER TYPE**—For use where pin should remain in bushing. Many sizes available in non-seizing bronze-plated steel.



*in this new  
Lamina  
catalog!*



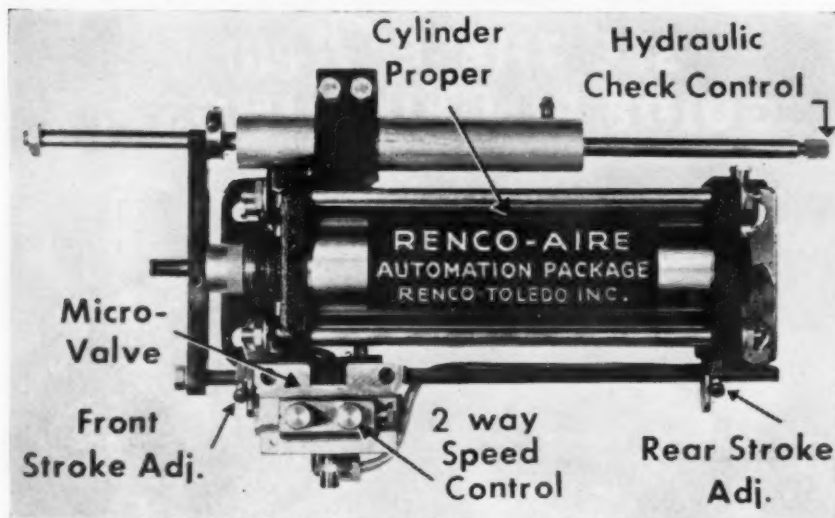
If you build or use die sets, you'll want your free copy of the new Lamina Catalog in a hurry! This big new book contains 36 pages complete with illustrations, applications, dimensions and prices of more than 800 Lamina Guide Pins, Guide Pin Bushings and accessories. New models, sizes, styles and materials make the new Lamina line the most complete ever offered to men who want to cut press operating costs and improve die and press efficiency. Write us now for your free copy.

*Lamina*

**DIES AND TOOLS, INC.**

P.O. BOX 31, ROYAL OAK, MICHIGAN

## Air Cylinder Has Built-In Micro-Action



A new automation package includes an air cylinder with a micro-action directional valve and adjustable 2-way speed controls, complete with a fully adjustable hydraulic check. The cylinder is available in any desired stroke.

The valve is air operated. No electrical installation is required. Cylinder requires only a single air connection. It is available in various mountings for immediate machine tool conversion. It converts such tools as hand mills, grinders, etc., for automatic table operation. Several air units may be mechanically interlocked to effect multiple machine cycles.

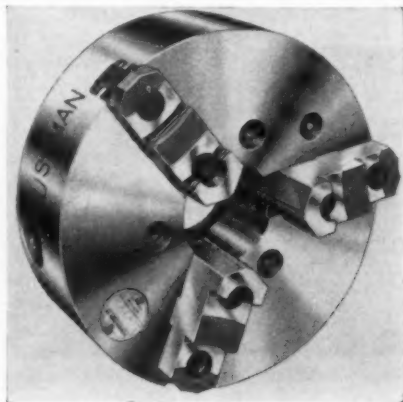
The valve operates on pressures as low as 1 psi with full automatic valve action, and is readily adaptable for low or high pressure operation. The valve will operate at over 3000 cycles per minute and the built-in stroke adjustment can be controlled to plus or minus .001". Renco-Toledo, Inc., Dept. MT-1, 819 N. Reynolds Rd., Toledo 7, O.

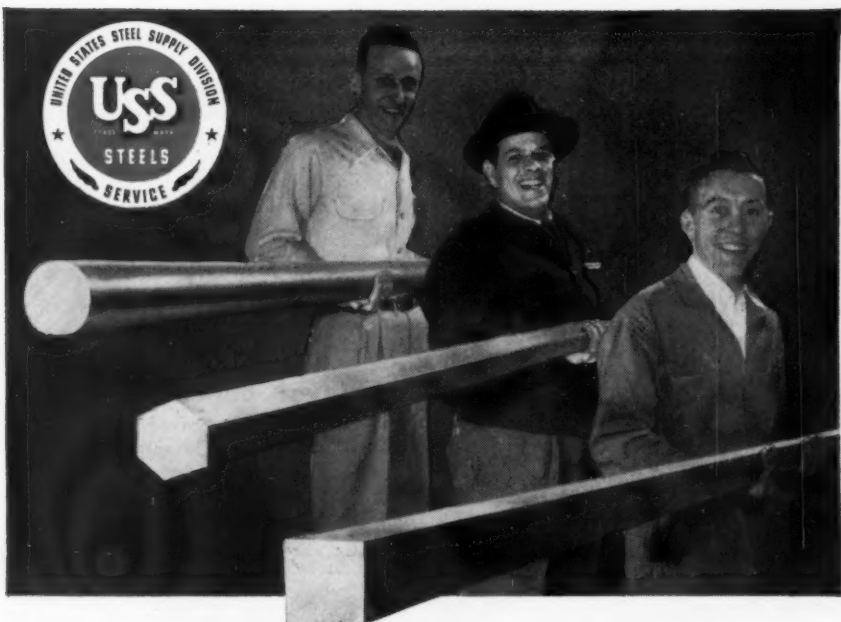
Use ACTION Card, opposite page 84, Circle No. 84

## Compensating scroll chuck

A 3-jaw, scroll operated, compensating chuck provides an appreciable amount of compensation and permits gripping of irregularly shaped workpieces which have been previously centered by some other medium than the chuck.

Jaw compensation is achieved by





## Any steel bar you need... STAINLESS • ALLOY • COLD FINISHED

Keeping a big stock of steel bars in various types, grades and sizes—in stainless, alloy and cold finished steels is a mighty big expense. And, there's no need for it. All U.S. Steel Supply warehouses\* carry a complete line of bars ready and waiting for your call. When you order steel from us, you get it fast—without delay. Why not make our warehouse your warehouse and let us carry

the expense of big inventory.

U.S. Steel Supply warehouses also carry big stocks of sheet, strip, plate, shapes, tubular products, bars, expanded metal, etc.—in stainless, and carbon and alloy steels. One order can cover all your steel requirements—and we will be glad to help you select the best steel for the job. Call your local U.S. Steel Supply salesman.

# U.S. STEEL SUPPLY

**DIVISION**

*General Offices*  
208 So. La Salle St., Chicago 4, Ill.



*\*Warehouses and Sales Offices*  
Coast to Coast

**UNITED STATES STEEL**

means of a two-piece scroll, the lower half of which is engaged by the pinion and concentrically located at all times by the chuck hub. Clearance provided in the chuck body permits the upper jaw controlling half of the scroll to float, thus providing the compensating feature. A drive lug, located on the lower scroll section, loosely fits into the upper scroll section.

Due to the specific problems encountered with each type of workpiece requiring compensation, The Cushman Chuck Co., Dept. DR, Hartford, Conn., will manufacture these chucks in standard sizes on request.

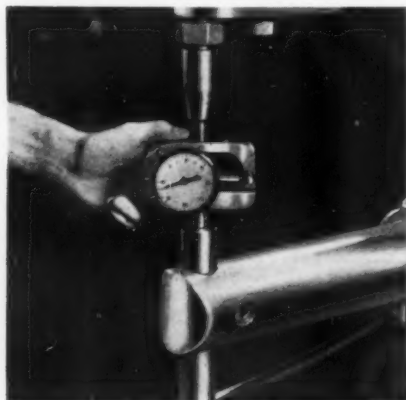
Use ACTION Card, opposite page 64. Circle No. 85

### Mechanical pressure gage

This compact instrument has been designed to measure mechanical pressures or compressive loads even in very limited space. It may be used alone or can be incorporated directly in special testing devices.

Each unit is individually calibrated—built with watchmaker's precision. Application is virtually unlimited. Adjustable micro-switch assembly will operate valves, motors, relays, warning lights or bells, etc.

The gage is built around a "U" shaped tool steel bar. To the bar, at its null



point, is mounted a jeweled dial indicator. Load is normally applied through a hardened ball resting in a steel cup on the top side of the bar. Slightest compressive action tends to close the open end of the bar. This pushes the indicator plunger inwardly as it moves up against the slanted plunger anvil. Actual force exerted is translated into a direct, visual reading on the dial. Capacities: 10 lb. to 10,000 lb. W. C. Dillon & Co., Dept. KE, 14620 Keswick St., Van Nuys, Calif.

Use ACTION Card, opposite page 64. Circle No. 86

### Engraver bench

A new Green engraver bench, made to hold the Model D2 engraver, is designed for the convenience of the operator. All functional parts of the pantograph are comfortably within reach.

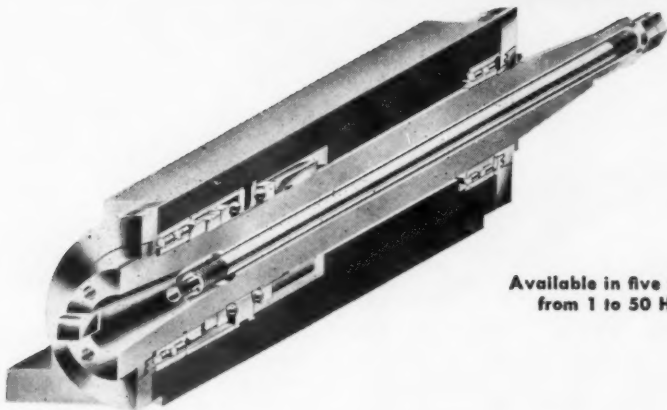
Bench provides a secure base and level surface. Dimensions: 28" long x 16½" wide. Recessed area with foot rest permits the operator to sit at a proper level and work comfortably at the open side of the pantograph, thus reducing fatigue. Green Instrument Co., Dept. JP, 385 Putnam Ave., Cambridge, Mass.

Use ACTION Card, opposite page 64. Circle No. 87



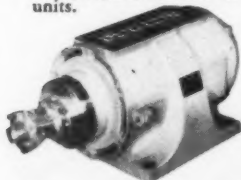
*Your BEST PACKAGED BUY in milling spindles*

# POPE HEAVY DUTY PRECISION SPINDLES



Available in five sizes  
from 1 to 50 HP

POPE HEAVY DUTY  
MOTORIZED MILLING  
MACHINE SPINDLES are  
available in P-2500 Series,  
from 1 to 100 HP, totally-  
enclosed, fan cooled; also  
in high cycle, water cooled  
units.



P-12000 Series *Belt Driven* in sizes from 1 to 50 HP, with Standard milling machine tapers in the nose from #10 to #60. *Operable in any position you specify.*

See: the big shaft, the heavy duty double row cylindrical roller bearings and thrust bearings that have extra ability and the rigidity to support your cutting tools.

*For complete dimensions, write for Bulletin S-8.*

You can specify POPE PRECISION SPINDLES with Confidence No. 110

*Specify*

## POPE

PRECISION SPINDLES

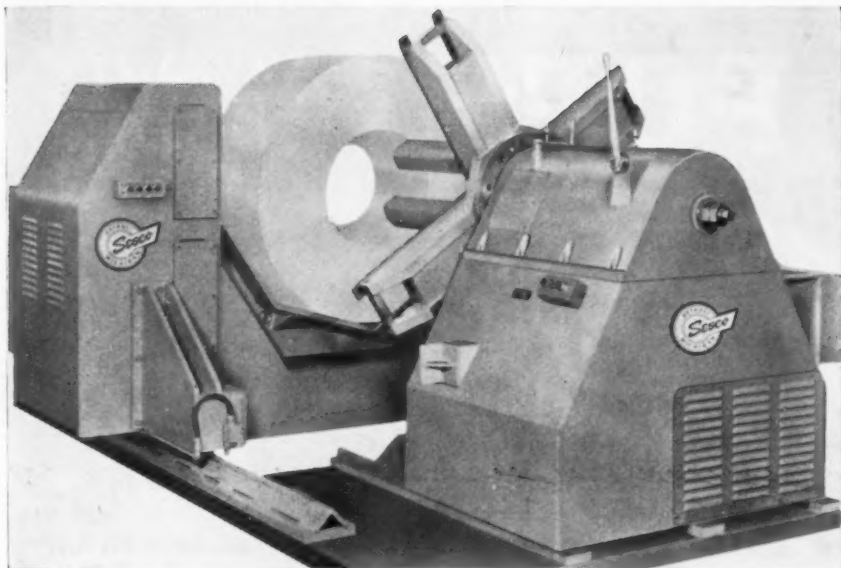
POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS

Circle No. 338 on Card, Opposite Page 65

## Power-Lift Loader



A power-lift coil loader, Sesco Lift Loader, is ruggedly constructed for long operating life. Its compact design eliminates the necessity of a pit.

The lateral movement is easily obtained, as it is mounted on rails, permitting freedom for loading of coil. The coil is elevated to obtain core alignment and then is transferred laterally on to the expander arms of the centering reel. The complete movement of the coil, both lateral and vertical, is by electrical power and is push-button controlled.

Loader can be built to handle multiple coils and to specifications to handle coil weights up to 40,000 lb. Sesco Inc., 8881 Central Ave., Detroit 4, Mich.

Use ACTION Card, opposite page 64, Circle No. 88

### Liquid spring has built-in shock absorber

The Taylor Liquid Spring Shok, a liquid spring with a built-in shock

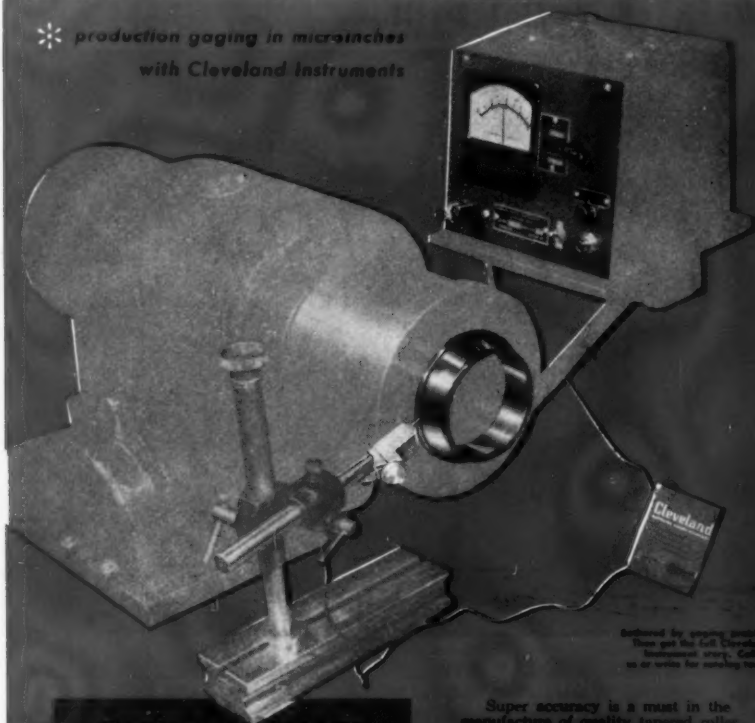
absorber using liquid compressibility, incorporates an integral hydraulic levering principle which permits the development of spring forces as low as 600 lb. with a 2" stroke plus energy absorption as a shock absorber. Wide extremes of spring force are possible with the same components while maintaining sturdy piston members of any desired rigidity.



The unit is 7- $\frac{3}{8}$ " long by 1- $\frac{3}{8}$ " in diameter plus mounting stud. It delivers 8000 lb. of spring force with a 1300 lb. preload with a 1" stroke. Taylor Devices Inc., Dept. RH, 188 Main St., North Tonawanda, N.Y.

Use ACTION Card, opposite page 64, Circle No. 89

\* production gaging in microns  
with Cleveland Instruments



Endured by every precision  
bore gage for full Cleveland  
Instrument story. Call  
us or write for sampling today.

Bearing manufacturer  
maintains accuracy  
of tapered roller  
bearings with

**CI\* Indi-Ac**  
exclusively

Super accuracy is a must in the manufacture of quality tapered roller bearings for machine tool spindles, special equipment and other precision applications. And to hold assembled bearings to a maximum permissible runout of .000075 inch means producing individual parts to a tolerance of 25 microns or less on a production line basis.

That's why one of America's leading bearing manufacturers uses Cleveland Instrument equipment for accurate, high-speed production gaging for size, concentricity of bores, squareness to face, taper when assembled, wobble and runout. For this manufacturer has found by experience that Cleveland Instruments are precise, accurate, flexible and give "laboratory" standards in production work.

Another problem marked "Solved" - by Cleveland Instruments.



LABORATORY PRECISION IN PRODUCTION GAGING

CLEVELAND INSTRUMENT COMPANY, INC.

735 Carnegie Avenue • Cleveland 15, Ohio

INDI-AC

Electronic Indicator

PAR-AC

Electronic Production Gages

MICRO-AC

Electronic Micrometers

AUTOSORT

Electronic Gaging and Sorting Units

Circle No. 339 on Card, Opposite Page 65

## Portable Drill Presses Do Work of Radial Drill



The machine shop at United Concrete Pipe Corp., Auburn, Wash., steel fabricating and erection firm, is now employing six portable magnetic drill presses to do the work that had required a huge radial drill press. Delivering up to 1,850 pounds of drill bit pressure, these Bux portable drill presses weigh

only 47 pounds and operate on 115 AC or DC.

Shop man carries his drill press wherever it is needed. Magnet has enough strength to hold portable drills with bits up to 1-½ inch. Drill press is manufactured by Buck Mfg. Co., Dept. KE, 100 Roberts Rd., Los Gatos 8, Calif.

Use ACTION Card, opposite page 64. Circle No. 99

## Ball-Bearing Measuring Attachment

A new ball-bearing measurement attachment, for use with Micro-Ac electronic comparators, gages ball bearings of from 1 millimeter up to 1½ inch diameter to an accuracy of ½-millionth of an inch.

The equipment, which can also be used for random sphericity gaging, is a V-shaped block mounted at a slight angle to permit the ball to roll into a

chute after completion of the gaging operation. A manually operated lever moves the ball into the gaging position under the Micro-Ac gage head. The ball is untouched by hand.

Gage head contact tip pressure is four ounces. Movement of the contact tip displaces a linear-voltage, differential transformer. This produces a signal which is directly proportional to the

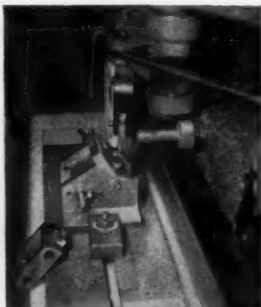
# How to take the guesswork out of contour-grinding

Moore Panto-Crush Wheel Dressers Step Up Latch Output 30% for I-T-E, Assure Interchangeability of Parts.



Five principal I-T-E circuit breaker parts finish ground with Moore Panto-Crush Wheel Dresser. Surface areas between arrows are ground. A comparison of pieces per hour between new method and old method follows:

Part	Moore Panto-Crush	Old Method	Saving
A	22	15	33%
B	32	22	31%
C	31	18	42%
D	14	12.5	10%
E	25	17	32%



Contour grinding of latch level—Part "E" at left. Here two surfaces and two radii, including inside fillet, are being ground simultaneously.

*I-T-E's experience with Panto-Crush Wheel Dressers was fully reported in "American Machinist." We'll gladly send you a reprint and our catalog.*

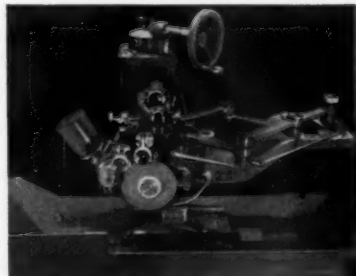
They've taken the "by-guess-and-by-gosh" out of the contour-grinding of toggle latches at I-T-E Circuit Breaker Company, Philadelphia, switchgear manufacturers. Moore Panto-Crush Wheel Dressers have solved the problem of accurate, interchangeable production of these moving mechanical parts so essential to faultless circuit breaker operation.

Irregular contours are now ground by wheels diamond-dressed to exact dimensions within .0002". Before installing Moores, I-T-E ground the contours by shifting the parts at different angles. Accuracy and field interchangeability suffered. Today both are completely satisfactory, and output itself is up 30%!

The Panto-Crush is mounted on the wheel spindle of a surface grinder. It is the only wheel dresser combining a precision-built pantograph for guiding the diamond from a template and a self-driven crush

former. You switch from one to the other without removing workpiece.

**MOORE SPECIAL TOOL COMPANY, INC.,**  
728 UNION AVE., BRIDGEPORT 7, CONN.

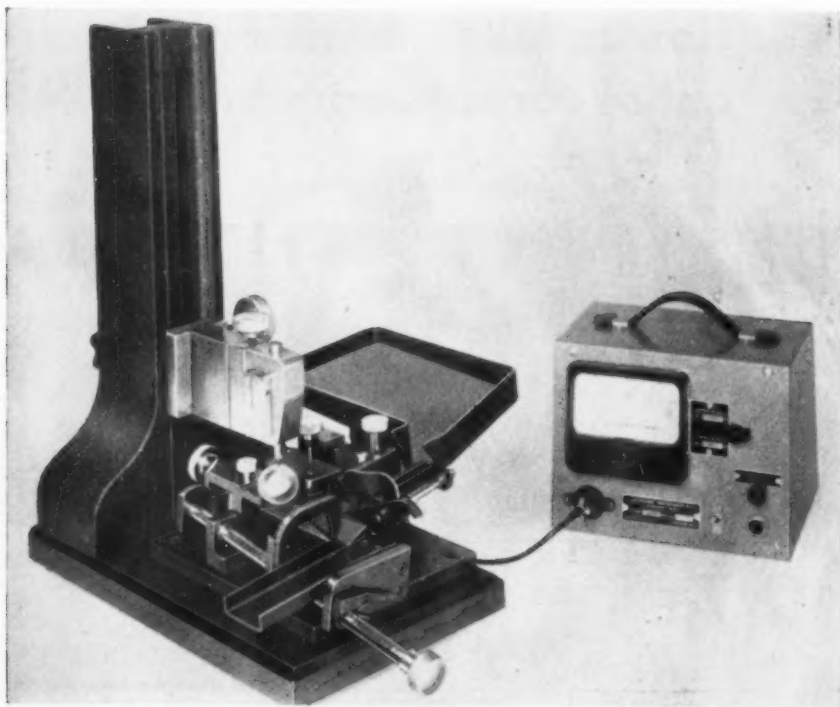


Moore Panto-Crush Wheel Dresser

## ADD TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • DIE FLIPPERS • COMPLETE LINE OF HOLE LOCATION ACCESSORIES

Circle No. 340 on Card, Opposite Page 65



amount of displacement of the contact tip from its zero position. This signal goes to the dual-sensitivity amplifier, the output of which is fed to the amplifier meter to show both the amount and direction of displacement either side of the zero position. Cleveland Instrument Co., Dept. RH, 735 Carnegie Ave., Cleveland, O.

Use ACTION Card, opposite page 64. Circle No. 91

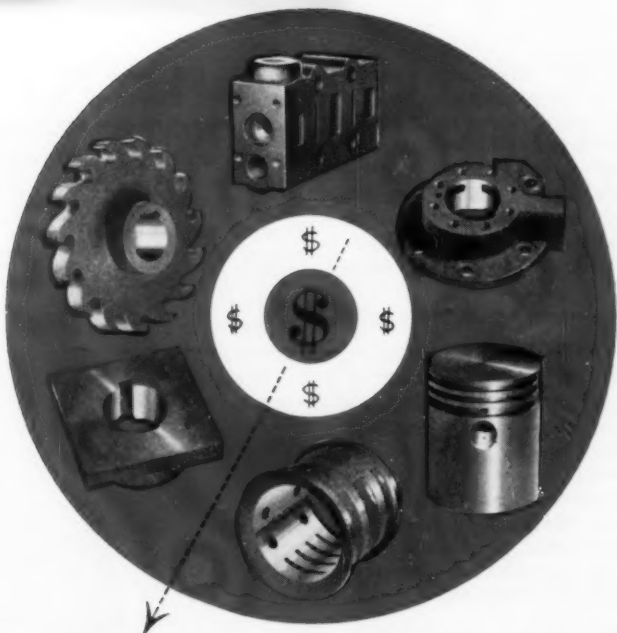
### **Test indicator performs two types of work**

The Check Master test indicator may be used for setup work on a surface plate and for truing of pieces in machine tools. Due to the mounting arrangement this one instrument will serve all usual cases with adequate visibility of the dial, obviating the need for



any additional instrument with dial perpendicular.

One model reads in .0001" and the other in either .0001" or in widely spaced



## YOU FIND **SAVINGS** IN EVERY HONED HOLE

One way or another . . . Sunnen Honing will cut your production costs:

1. It eliminates chucking and set up (you often complete the job in less time than required to set up other machines).
2. Interchangeability of honed parts makes assembly of mating units faster, easier.
3. In many cases, honing eliminates grinding, broaching, double reaming and finish boring.
4. Increases production when used for final sizing of holes partly completed on automatic machinery . . . eliminates bottlenecks.
5. Does not require expensive skilled labor.
6. Assures longer product life with less maintenance.

TODAY'S TOLERANCES AND FINISHES CALL FOR HONING

LEARN HOW SUNNEN HONING CAN  
HELP YOU CUT PRODUCTION COSTS

clip and mail coupon now



Circle No. 341 on Card, Opposite Page 65

**SUNNEN**  
PRODUCTS COMPANY

7943 MANCHESTER AVE. • ST. LOUIS 17, MO.

6856

- ☐ HAVE ENGINEER CALL FOR FREE DEMONSTRATION  
☐ SEND CASE HISTORIES AND TECHNICAL INFORMATION

NAME \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

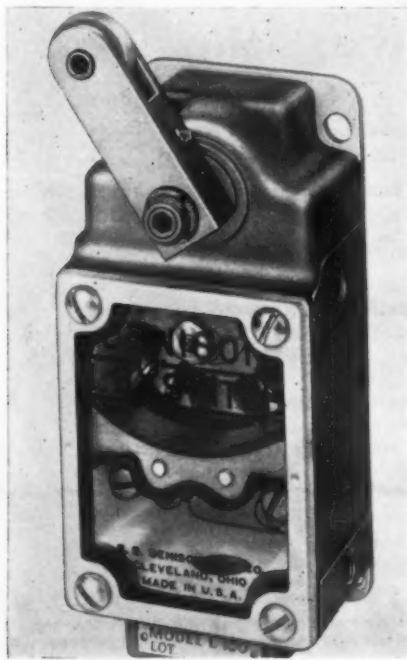
divisions of .001". The latter model, fitted with a longer contact arm, has the advantage of being able to get into places which would otherwise be inaccessible.

Manufacturer claims the indicator to be unusually sensitive, responding to dimensional variations of .00002". Standard Gage Co., Inc., Dept. RS, Poughkeepsie, N.Y.

Use ACTION Card, opposite page 64, Circle No. 92

### Limit switch has watertight plastic cover

A watertight plastic cover on the Lox-switch limit switch permits the operator to observe the contact action in the interior without removing the cover. Switch has successfully completed kerosene and under-water tests. A watertight neoprene gasket provides a positive water seal between the housing of the switch and the cover. R. B. Deni-



son Mfg. Co., Dept. RH, 102 St. Clair Ave., N.W., Cleveland 13, O.

Use ACTION Card, opposite page 64, Circle No. 93

### Surface test indicator

Superior indicator Model 75X has a double face and reads both sides. A constant reading is always visible to operator as indicator is turned. Dial is enclosed by two non-breakable crystals and reads easily at arm's length. No holding rods hide either face as indicator swivels from end of case. The universal swivel which holds the indicator permits adjusting indicator into any position within a range of .150 to 6".

This model 75X is especially adaptable



for jig bore, jig grinding setup but can also be used on all tool room or production work, as simple holding adaptors are available making this model usable on a surface gage, magnetic base or vernier height gage, lathe, etc. Superior Indicator Co., Dept. RH, P.O. Box 734, Rochester 3, N.Y.

Use ACTION Card, opposite page 64, Circle No. 94

# SEND FOR THIS FREE ATRAX SOLID CARBIDE BUR SELECTOR CHART

## Today!



127 solid carbide burs  
shown full size!

Packed with tips  
for better  
bur performance!

Shows cuts  
available:  
STANDARD-  
FINE-COARSE-  
EXTRA COARSE-  
DIAMOND -  
CHIP BREAKER!

All the information for  
ordering the right solid  
carbide bur for any job!

Illustrates virtually all  
standard sizes and shapes!

Colorful, easily read-  
18½" x 27½" with permanent  
plastic coating for  
years of use!

Bur speed chart  
for all materials!

Hang this permanent chart in your  
plant... solve solid carbide bur prob-  
lems on the spot. Send now for your  
free copy.

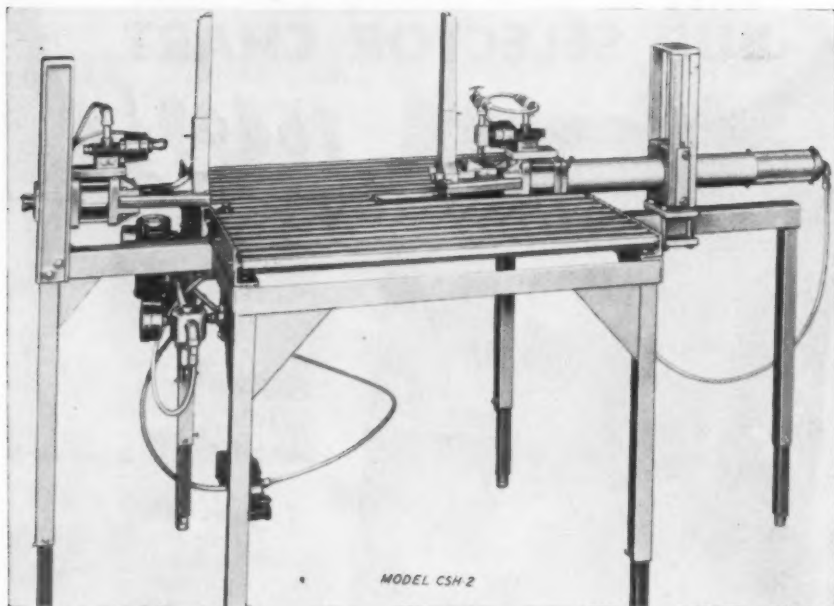
Mailed in rigid tube  
...and it's FREE!



**THE ATRAX COMPANY**  
Newington 11, Conn.



## Machine Staples Both Carton Ends Simultaneously



Automatic "tap-touch" stapling fastens flaps with an automatic tap; staples at a touch any carton within range; closes cartons by completely mechanical means.

Model CSH-2 stapler has no electrical connections, the important design novelty being in the automatic mechanical

trip. Fully automatic lubrication is assured by a valving arrangement continuously exhausting nebulized oil over moving parts, eliminating manual oiling. Container Stapling Corp., Dept. RB, 308 N. Park Ave., P.O. Box 247, Herrin, Ill.

Use ACTION Card, opposite page 64. Circle No. 95

## Conditioning the Tooth Surfaces of Hardened Pinions

The tooth surfaces of hardened automotive pinions can be rapidly conditioned by a process performed on the No. 8B gear burnishing machine made by the Fellows Gear Shaper Co., Dept. JP, Springfield, Vt. The process requires only a few seconds per piece. The machine is equipped for automatic operation.

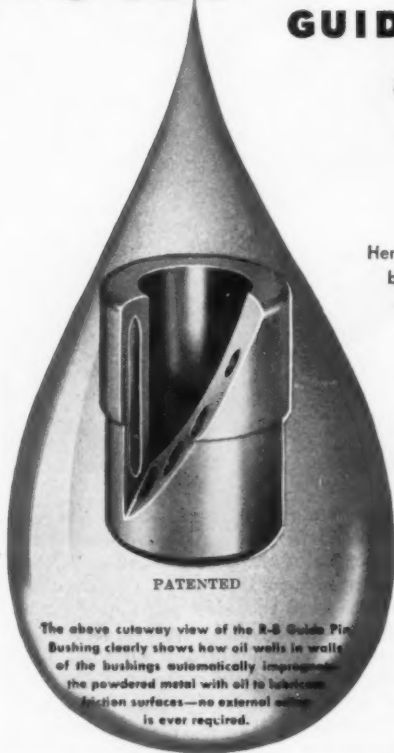
As shown in the photograph, the

pinion is run in close mesh with three hardened work-gears, the lower gear at the left being the driver. There are two speeds for the shaft on which this gear is mounted. Slow rotation for loading and unloading operations is obtained by means of an auxiliary motor having an overrunning clutch. When electromagnetically coupled, the main motor overtakes and overruns this

# NOW!

## Self-Oiling

### GUIDE PIN BUSHINGS OF POWDERED ALLOY STEEL



The above cutaway view of the R-B Guide Pin Bushing clearly shows how oil wells in walls of the bushings automatically impregnate the powdered metal with oil to lubricate friction surfaces—no external oiling is ever required.

Here's an entirely new concept in guide pin bushings—made of heat treated powdered alloy steel, each bushing has filled internal oil wells. Lubrication to friction surfaces is automatic and no external oiling is required throughout the long life of the bushings.

Wear characteristics of these bushings are comparable to that obtained with finest bronze bushings. In addition, this new R-B design greatly reduces guide pin wear and the possibility of seizing or galling. Self-oiling, less guide pin wear and longer life add up to minimum maintenance, reduced costs and maximum usage of press time.

#### RICHARD BROTHERS PUNCH DIVISION ALLIED PRODUCTS CORPORATION

Dept. 79 • 12621 Burt Rd. • Detroit 23, Michigan

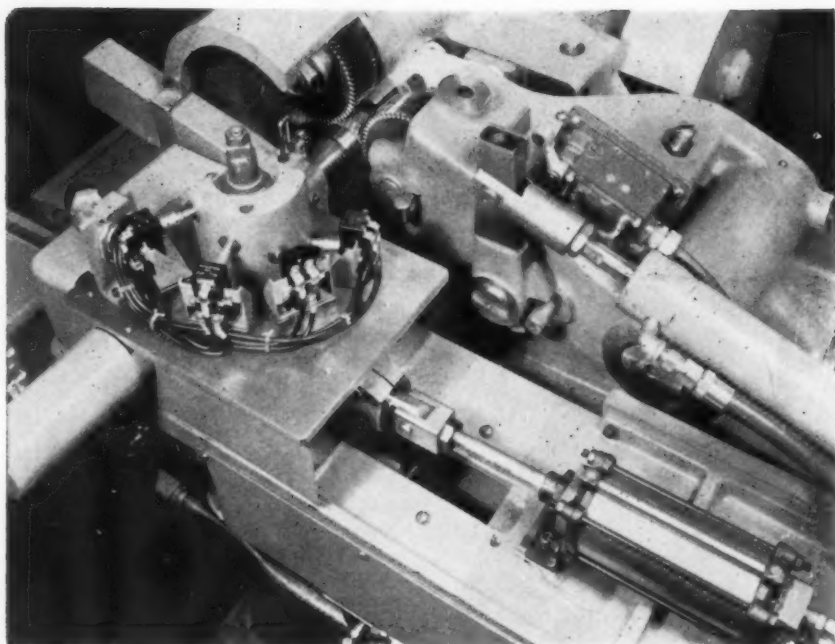
Please send me additional information.



NAME \_\_\_\_\_ TITLE \_\_\_\_\_  
COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**ALSO PRODUCED IN  
OTHER ALLIED PLANTS**  
SPECIAL COLD FORGED PARTS  
FERROUS POWDERED METAL  
PARTS  
STANDARD CAP SCREWS  
PRECISION GROUND PARTS  
SHEET METAL DIES  
MADE OF FERROUS ALLOYS,  
ZINC ALLOYS OR PLASTICS

Circle No. 343 on Card, Opposite Page 65



clutch to give fast rotation for the pre-set running time.

The work-gear at the right is mounted in a fulcrumed arm through which the necessary pressure is applied. This arm is raised by an air cylinder for loading and unloading the work. A second cylinder actuates a ram in which there is an arbor, slightly smaller in diameter than the hole in the pinion, for carrying the pinion into the operating position. Both air cylinders function automatically by cam operated electrical controls.

At the start of a sequence of automatic operation, the ram is drawn back to allow one pinion to roll from the feed chute into the loading position. The ram moves ahead at high speed, inserts the arbor in the piece and carries it toward the work gears. As the pinion

nears them, the speed of ram travel is reduced by applying air to a Hydro-check valve through a micro-switch and solenoid, and the pinion is moved into mesh with the slowly rotating work-gears. The ram and pinion continue to advance to a fixed stop, pushing the previously completed piece out of mesh and into the discharge chute. The ram travel direction is reversed and movement stopped when the new position is in the operating position. The work-gear on the fulcrumed arm is now lowered into position and the work-gear drive shaft begins to rotate at high speed. At the end of the preset time cycle for conditioning the tooth surfaces, slow rotation of the work-gears is resumed, the fulcrumed arm is raised and the loading arm is retracted. Another pinion rolls into loading position and the sequence is repeated.

Use ACTION Card, opposite page 64. Circle No. 96

# ENGINEERS

## STEEL SQUARES

### PRECISION GROUND

#### No. 400 SQUARE DIMENSIONS

Size	Thick- ness of Stock	Width of Stock	Length of Stock	Thick- ness of Blade	Width of Blade	Length of Blade inside Stock	Total Length of Blade
in.	in.	in.	in.	in.	in.	in.	in.
2	5/16	5/8	1-7/8	1/16	5/8	2-1/4	2-7/8
3	3/8	3/4	2-1/2	1/16	3/4	3-1/4	4
4	3/8	3/4	3	1/16	3/4	4-1/4	5
5	7/16	7/8	3-1/2	1/16	7/8	5-1/4	6-1/8
6	1/2	1	4	1/16	1	6-1/4	7-1/4
8	5/8	1-1/4	5	3/32	1-1/4	8-1/4	9-1/2
10	3/4	1-1/2	6	5/32	1-1/2	10-1/4	11-3/4
12	7/8	1-3/4	7	5/32	1-3/4	12-1/4	14
18	1	2-1/2	10	3/16	2-1/2	18-1/4	20-3/4
24	1-1/4	2-1/2	13	3/16	2-1/2	21-1/2	24
30	1-1/2	3	15	3/16	3	27	30
36	1-3/4	3-1/2	18	1/4	3-1/2	32-1/2	36
42	1-3/4	3-1/2	21	1/4	3-1/2	38-1/2	42
9	3/4	1-7/16	5-1/2	1/8	1-1/2	9-1/4	10-3/4

Also: ▲

Size	Price
2"	\$3.00
3"	3.50
4"	4.00
5"	4.50
6"	5.00
8"	6.00
9"	6.50
10"	7.00
12"	9.00
18"	30.00
24"	40.00
30"	50.00
36"	75.00
40"	95.00

Up to 12" each square is supplied in a strong wooden box. Larger than 12" squares are supplied in strong wooden sheaths.

These Squares have been introduced to meet the demand for accurate tools for use by the engineer on production work. The square blades are hardened and tempered. As a Square of this accuracy is a delicate instrument, each one is packed in a separate wood box, and we believe that this will be appreciated by those engineers who take pride in their tools.

## EQUIPMENT CORP.

188-190 Elizabeth Avenue  
NEWARK 8, NEW JERSEY

Circle No. 344 on Card, Opposite Page 65

## Hole saws have welded edge blades

Milford high speed steel hole saws, used in portable air and electric drills, drill presses, lathe tailstocks etc., cut clean, round holes in virtually any machinable metal or other material.

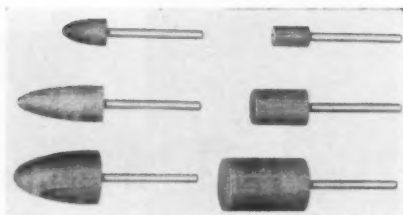


Welded edge blade construction provides hard, sharp, fast-cutting, long wearing teeth combined with a tough, resilient back. Saws are furnished with 6 teeth per inch and have a cutting depth of 1½". Henry G. Thompson & Son Co., Dept. MG, 277 Chapel St., New Haven, Conn.

Use ACTION Card, opposite page 64. Circle No. 97

## Mandrel mounted bobs made of Hydulignum

Conical and cylindrical bobs of Hydulignum, a dense, tough material formed of highly compressed, laminated hard wood, are designed primarily for



lapping or finishing with diamond compounds. The compressed grain direction is perpendicular to the circumference, which provides a uniform surface for efficient charging and retention of the diamond particles.

The cones or cylinders are centered on ½-inch diameter shafts, and exactly balanced to prevent chatter or bounce when used with a flexible shaft rotary tool. Engis Equipment Co., Dept. MM, 431 So. Dearborn St., Chicago 5, Ill.

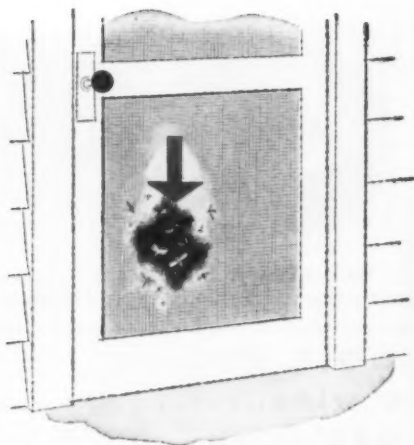
Use ACTION Card, opposite page 64. Circle No. 98

## Bond produces diamond wheel which does not glaze

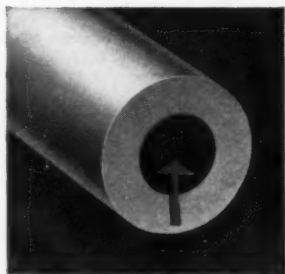
A new bond for diamond wheels, Cera-Met, has produced a wheel which does not glaze even if carbide and steel are ground at the same time. Wheels cut fast, maintain sharp corners. No need for frequent dressing.

The bond actually wets and adheres to each diamond grain regardless of how fine, gripping it so firmly that you cannot knock it out—you have to wear it down. After the diamond is worn flat, a breakaway action will release the diamond particle, thus exposing a fresh diamond edge. This action continues throughout the life of the wheel so that the grinding surface is always clean and sharp. Clipper Diamond Tool Co., Dept. MG, 21G West 46th St., New York 36, N.Y.

Use ACTION Card, opposite page 64. Circle No. 99



a hole here is a nuisance...



a hole here is convenient

**Crucible Hollow Tool Steels** eliminate the nuisance of drilling, boring, cutting-off or rough-facing of ring-shaped, tubular or bored tool steel parts. They save you money, too, by reducing machine time and scrap losses.

Crucible Hollow Tool Steels are produced in all of the famous Crucible tool steel grades...in bars or saw cut lengths to meet your needs. And they're available in almost any combination of O.D. and I.D. sizes. You can get these five grades "off the shelf" from your local Crucible warehouse: KETOS oil-hardening... SANDERSON water-hardening... AIRDI 150 high-carbon, high-chromium... AIRKOOL air-hardening... NU DIE V hot work.

See how Crucible Hollow Tool Steel Bars will save you hours of shop time. Call your Crucible representative. *Crucible Steel Company of America, The Oliver Bldg., Mellon Square, Pittsburgh 22, Pa.*

**CRUCIBLE**

first name in special purpose steels

**Crucible Steel Company of America**

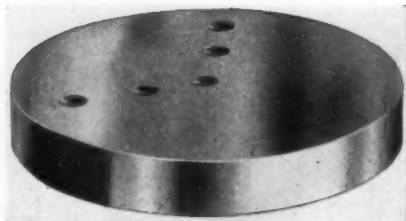
Canadian Distributor — Railway & Power Engineering Corp., Ltd.

Circle No. 345 on Card, Opposite Page 65

## High strength steel bar requires no heat treating

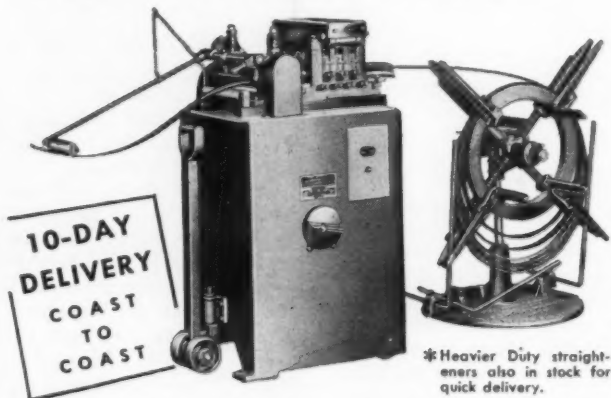
Fatigue Proof, a high strength, free machining steel bar which requires no heat treating, has in-the-bar properties usually associated only with heat treated steels.

Quench cranks and distortion from heat treating is eliminated. Secondary operations such as cleaning, straightening, inspection, are unnecessary.



Surface finish is excellent. Tensile strengths are in the range of 140,000 to

## STRAIGHTEN COIL STOCK from 1/2' to 8' wide... from .018" to .065" thick... on a LITTELL "308"\*



\*Heavier Duty straighteners also in stock for quick delivery.

Littell "308" Variable Speed Straighteners flatten coil stock...synchronize feeding of stock with speeds of automatic presses...simplify hand feeding. The "308" has brought new speed, efficiency and economy into stamping, blanking and shearing operations from coast to coast. Get full details on these portable straighteners.

Write for Catalog Section 3H



ROLL FEEDS • COIL CRADLES  
STRAIGHTENING MACHINES  
REELS • AIR BLAST VALVES  
District Offices: Detroit, Cleveland

4147 N. RAVENSWOOD AVE. • CHICAGO 13, ILL.

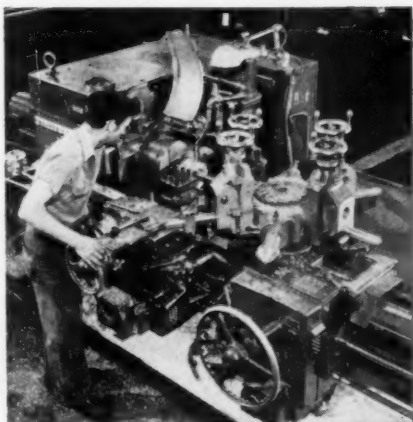
Circle No. 346 on Card, Opposite Page 63

# WARNER & SWASEY 1-A efficiently handles small lot brass work at Beloit Iron Works

Giant, city-block-long paper making machines made by Beloit Iron Works, Beloit, Wisconsin, require hundreds of different precision machined parts—in extremely small lots. For much of their turning work, Beloit depends on a large battery of Warner & Swasey turret lathes, machines ideally suited to the different classes of small lot work they have.

A new Warner & Swasey 1-A Universal Extra Heavy Duty Turret Lathe was selected to handle an especially critical turning problem. This involved the production of brass castings in lots less than 15 pieces, where the qualities of high speed and great power are required, in addition to extreme machine maneuverability. The new Warner & Swasey 1-A is designed to meet just such demands!

Its zoned operating controls put all machine controls within easy reach. Operators can quickly and easily set the cross slide, the hex turret unit, or position tools. The 1-A's all-clutch headstock permits instantaneous speed changing for fast, effortless headstock handling. And for threading or forming cuts, a 4 to 1 speed reduction can be obtained instantly without preselection merely by flipping the speed change lever in the opposite direction. The power chuck wrench further speeds handling time, cuts operator fatigue. A 30 hp, two-speed motor furnishes all the power necessary for high



speed brass turning plus a range of 32 unduplicated cutting speeds.

This 1-A, like the other Warner & Swaseys, has proved its efficiency for Beloit Iron Works because it is matched with the type and range of work for which it is designed. Our Field Representative will be glad to work with you to select the machine tools that will similarly best suit your needs.



**YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY**

Circle No. 347 on Card, Opposite Page 65

150,000 psi, with a hardness related to this strength level of approximately 30 Rockwell C. The bar also has good wear resistance, increased resistance to fatigue and service failures, plus a high degree of dimensional stability and freedom from locked up residual stresses. LaSalle Steel Co., Dept. HS, Hammond, Ind.

Use ACTION Card, opposite page 64. Circle No. 100

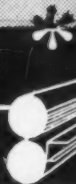
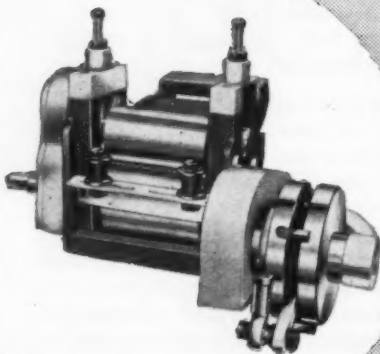
## Electrode for low voltage welding

An all-position E-6013 electrode, Fleetweld 37, for ac or dc current, is useful in welding sheet metal where burn-through, sticking and poor fit-up may be problems, when using low open circuit voltage welding machines, or for steel plate fabricating where an all-

# \* "RFC" fits any press

Yes, ROLL-FEED Provides a complete line of precision Feeds, ready for mounting for all types of presses. Adaptable for use on bench or pedestal type power presses. Comes complete with adjusting disc, mounting bracket and connecting linkage.

Can't slip . . . each wedge has four points of contact to safeguard accuracy. Feeds in thousandths . . . amazingly accurate stock movement assured. Reverses instantly. Maintains original setting . . . regardless of use or wear. No ratchets or pawls to wear down and "throw off" feed spacing. Write for illustrated folder giving specifications.



## Roll-Feed Corporation

ASHTON, R. I.

Circle No. 348 on Card, Opposite Page 65

# Magnaflux Inspection



## *ensures* **CIRCLE R QUALITY**

We specialize in the finest saws and other circular metal cutting tools. Quality is controlled and cost is lowered with scientific Magnaflux Inspection. This method reduces to minimum the occurrence of flaws in our product. For us, it identifies rejects before they reach the costly finishing stages. For you, it eliminates much of the usual down time due to defects. Refer to Catalog N for the complete line of Circle R cutting tools for automation and standard production.

### **Precision cutting tools for automation and standard production**

Consult CIRCLE R Specialists in —

Burbank  
Chicago  
Cleveland  
Dayton  
Detroit

Hackensack  
Indianapolis  
Kansas City  
Milwaukee

New York City  
Philadelphia  
Montreal  
Phoenix

Pittsburgh  
Providence  
Rochester  
St. Louis  
Westbury, L. I.



METAL SLITTING SAWS  
COPPER SLITTING SAWS  
SCREW SLOTTING SAWS  
COMMUTATOR SLOTTING SAWS  
JEWELERS' SLOTTING SAWS  
CUT-OFF SAWS • CIRCULAR  
KNIVES • ROTARY SHEAR  
BLADES • CARBIDE STEEL  
SAWS • SOLID & TIPPED  
TUNGSTEN • CARBIDE SAWS  
COMBINED DRILLS & COUNT-  
ERSINKS • CENTER REAMERS



## **CIRCULAR TOOL CO., INC.**

PROVIDENCE 5, RHODE ISLAND

*Specialists in Circular Cutting Tools Since 1923*

Circle No. 349 on Card, Opposite Page 65

position, easy operating electrode is desired.

It is claimed to have excellent arc stability. The arc is steady on both ac and dc currents, even when used with welding machines having an open circuit voltage as low as 44 volts.

The arc is soft and smooth and easy to handle. A drag technique may be used. Slag characteristics make for quick removal, good bead appearance and sim-

plify vertical up welding.

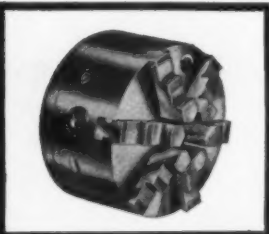
The electrode is available in  $\frac{1}{8}$ ",  $\frac{5}{32}$ " and  $\frac{3}{16}$ " sizes. The Lincoln Electric Co., Dept. RH, Cleveland 17, O.

Use ACTION Card, opposite page 64. Circle No. 101

### Aluminum putty

Devcon F, which consists of approximately 80% aluminum and 20% plastic, fills large and small holes in aluminum and steel castings, covers holes which have been drilled incorrectly, and builds

## compare HORTON Tru-Set FEATURES



- Repetitive accuracy to .0002" T.I.R. guaranteed
- Rugged Meehanite bodies guaranteed for life
- Instant peripheral location - 3 operating pinions
- Available up to 12" in both 3 and 6 jaw styles
- Packed in reuseable airtight metal containers

## compare HORTON Tru-Set PRICES

SIZE	MODEL	NET PRICE
5	5T6	86.35
6	6T6	120.65
8	8T6	167.65
10	10T6	247.65
12	12T6	298.45

Chucks listed above are 6 jaw universal type with two sets of jaws. See your Horton Distributor or write direct for new Net Price Selector



**HORTON CHUCK**  
WINDSOR LOCKS, CONN.



STAN ... the Die Set Man Says:

*"Standard"*  
**CHROME VANADIUM  
DIE SPRINGS KEEP  
PRODUCTION  
HUMMING!**

**DEPENDABLE UNIFORMITY!** Made from the finest electric furnace chrome vanadium steel, Standard Die Springs meet the most exacting standards for quality and performance.

**MAXIMUM SPRING LIFE!** Because of their metallurgical and design features, Standard Die Springs last longer even under the toughest conditions.

**REDUCE DOWNTIME!** Minimum replacement and labor — maximum production.

**COMPLETE LINE!** Standard Die Springs may be ordered in all types and sizes.

**FOR FAST SERVICE,** order Standard Die Springs through your nearest Standard Die Set Branch Office.

**NOW ... STANDARD SIMPLIFIES  
DIE SPRING SELECTION!**

**New! Spring Selection Chart**

Easy-to-read Wall Chart contains complete specifications on all types and sizes of Standard Chrome Vanadium Die Springs. Send coupon.



**New! Die Spring Catalog**

Contains complete technical data, specifications and prices on all Standard Die Springs. Send coupon.



**There's a difference in  
die sets, and STANDARD  
makes the difference!**

MAIL  
THIS  
COUPON  
NOW

**STANDARD DIE SET MFRS., INC.**  
**1489 Elmwood Ave., Prov. 7, R. I.**

New York • Philadelphia • Buffalo • Detroit  
Grand Rapids • Indianapolis • Louisville

Please send

☐ Die Spring Catalog ☐ Wall Chart

Name

Company

Address

Circle No. 351 on Card, Opposite Page 63

*"My WALES FABRICATOR didn't cost me a DIME!"*



- HOLE PUNCHING
- NOTCHING and NIBBLING
- 165 strokes per minute.
- Built-in gauging, positive alignment mean **MORE** profit.

"My production work is a real money maker now . . . against stiff competition too. I've cut my 'set-up' work down to less than one minute. This 'WALES-WAY' deal is a life-saver for me."

With the WALES FABRICATOR you can change punches and dies in less than 20 seconds. No templets needed . . . work direct from prints. Handle small and large work with equal facility. Quick change holders up to 3-1/2" capacity. Completely automatic alignment . . . ALWAYS.



Send for  
**BULLETIN No. 16A**  
Describes the WALES FABRICATOR with pictures and examples of work.

**WALES *Strip* CORPORATION**  
"...the Wales-Way is the PLUS-PROFIT way"  
345 PAYNE AVE. — North Tonawanda, N.Y.  
WALES-STRIPPED BY CANADA LTD. HAMILTON, ONT.

Circle No. 352 on Card, Opposite Page 65



A representative group of castings repaired with Devcon F.

up worn sections. The machined surface looks like aluminum or polished steel. Material is as easy to use as modeling clay. A large mass can be applied to a vertical surface and will not run or sag.

Putty adheres to aluminum, steel, bronze, brass, and cast iron. It will bond to a flat surface and can be machined to a feather edge. It is not necessary to undercut the metal or treat it in any special way.

Chemical Development Corp., Dept. JP, Danvers, Mass.

Use ACTION Card, opposite page 64. Circle No. 102

## Interchangeable steel type holder

The Nobility hand type holder accommodates interchangeable steel type



get **DOUBLE ACTION** with...

## HELLER NUCUT<sup>®</sup> Wavy-Teeth<sup>®</sup>

### FILES

#### OVERCUT

The "overcut" creates a pattern of coarse and fine teeth.

HELLER NUCUT Wavy-Teeth design combines both coarse and fine teeth in the same file to give fast stock removal and leave a smooth finish.

The coarse teeth cut fast, take a good bite, while the fine teeth break up the chips and permit quick clearing from the file.

This **DOUBLE ACTION** makes it possible to file with less effort and remove more metal with fewer strokes. Loading is minimized, chatter reduced and a smoother finish produced.

This is why **HELLER Wavy-Teeth** files are easier to use, last longer, cut filing costs. It will pay you to ask for **HELLER NUCUT WAVY-TEETH** next time you order files!

When the "upcut" is added the "Wavy-Teeth" is designed.

# HELLER TOOL CO.

Subsidiary of Simonds Tool and Steel Co.

## NEWCOMERTOWN, OHIO

BRANCHES: New York, Detroit, Chicago, Los Angeles



YOUR HELLER DISTRIBUTOR CAN SUPPLY ALL YOUR FILE NEEDS

Look for the  
Heller  
White  
Tang

for random setup of part numbers, heat codes, date codes, etc., for the hand stamping of castings, forgings and machine parts. This holder is used whenever parts are too big or cumbersome to bring to a marking machine or marking press or when production quantities do not warrant a machine operation. The entire impression can be made with one hammer blow.

Short, wide frame reduces weight while increasing strength. Made of alloy steel, the frame is heat treated for long life and the elimination of spawling.

The type slots are precision machined for proper type alignment and squareness. The holder is equipped with a removable, hardened seat and an oversize socket-head cap screw which clamps the type firmly in place. Holders are available in these capacities and sizes: for 1/16" type, 6, 8, 9, 12, 15 piece capacity; for 3/32" type, 5, 6, 8, 10, 12 piece capacity; for 1/8" type, 4, 5, 6, 8, 10, 12 capacity. The Noble and Westbrook Mfg. Co., Dept. MG, 20 Westbrook St., East Hartford, Conn.

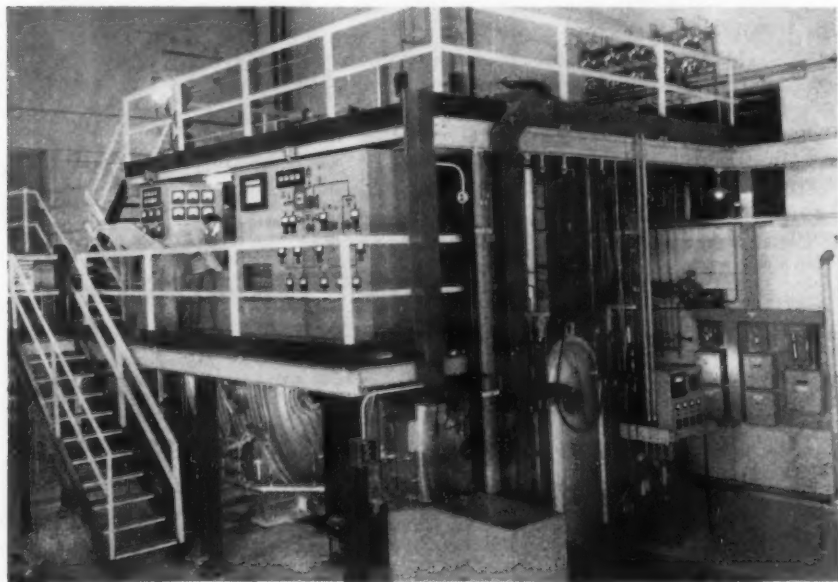
Use ACTION Card, opposite page 64. Circle No. 103

## Largest Vacuum Melting Furnace

The nation's largest vacuum melting furnace, weighing 2200 lb., is remotely operated by the melter, who can control from one console the charging, mold transfer, and pouring operations. The melting unit is enclosed in a 3/4 inch thick air tight and liquid cooled stainless steel chamber, with connecting air lock chambers for charging raw

materials and discharging ingots. The design makes it possible to charge, melt, pour and remove ingots without affecting the vacuum in the melting chamber. The mold handling mechanism makes it possible to cast ingots of varying size and shape, either singly or in multiples from a single heat. Vacuum Metals Corp., Pittsburgh 22, Pa.

Use ACTION Card, opposite page 64. Circle No. 104



# new Carlton pre-selector



## One of 3 different speed-feed controls for Carlton radial drills

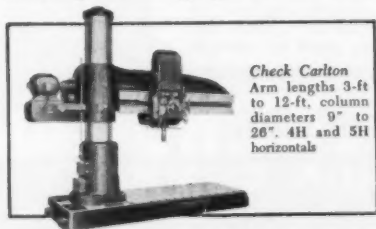
The new Carlton-Leber speed-feed pre-selector system speeds up drilling by permitting operator to set speed and feed for the next operation while the machine is still under cut. With this productive new device, the time lost heretofore in setting speeds and feeds is now used for almost continuous drilling. Now you stop the spindle only for changing cutting tools. Additional time is saved by instantaneous gear shifting made possible by mechanically oscillating the change gears which assures

quiet gear mesh.

**Programming**—another Carlton-Leber system used in connection with the pre-selector. Pre-selects speeds and feeds for as many as 20 or 30 operations in an entire drilling program.

**Manual Gear Shift:** 2 shift levers for controlling speeds, 2 for feeds . . . select speed-feed combinations manually, one at a time.

Write for descriptive bulletin giving complete information. The Carlton Machine Tool Co., Cincinnati 25, Ohio, U.S.A.



Check Carlton  
Arm lengths 3-ft  
to 12-ft, column  
diameters 9" to  
20". 4H and 5H  
horizontals

# Carlton

*horizontal and radial drills*

Circle No. 354 on Card, Opposite Page 65

### Small size shipping bag

A Jiffy padded shipping bag measuring only 4" x 8" is used for shipping small objects, such as machine accessories, hardware. Bag weighs less than one ounce. It has built-in cushioning, strong kraft on the outside and inside, serrated edges. Can be closed with gummed tape or staples. Free samples can be obtained from Jiffy Mfg. Co., Dept. RS, Hillside, N.J.

Use ACTION Card, opposite page 64. Circle No. 105

### Foot control for band saw table

The DoAll foot control for band sawing machines provides a means for effortless control of the forward or return stroke of the hydraulic table. It also permits the table to be stopped at any point in its travel. Operated in conjunction with a switch on the instrument panel of the band machine, this pedal control can be made in-

**SYNTRON**  
Vibrating  
**LAPPING  
POLISHING  
MACHINES**



**Before After**

- Automatic, high-speed lapping and polishing of parts, samples, etc.
- Produce perfect metallographic finishes in one-third the time.
- Eliminate use of expensive polishing wheels—practically no rejects.

New Syntron Lapping-Polishing Machines are completely automatic. Driven by variable controlled electromagnets, they assure a positive, even polishing action on practically any part or sample where microscopic finishes are required. No expensive installation or grinding equipment required.

**Of proven dependable Quality**

Write for **FREE**  
Catalogue Data

**SYNTRON COMPANY**

300 Lexington Ave.

Homer City, Pa.

Circle No. 355 on Card, Opposite Page 65

**in MILL HEADS**

**RUSNOK**

**Builds the BEST Quality  
at the BEST Price**

**1/4 H.P. CONVERTICAL MILL HEAD**

Only low cost mill head with quill travel attachment.

High speed medium-light operation.

For bench, floor and pedestal mills.

Fits milling machines with overarm 1 1/2" to 3".

3/8" end mill capacity.

**\$245.00**



**RUSNOK**

**1/2 H. P. MILL HEAD**

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.

**1 H. P. MILL HEAD**

HEAVY DUTY MILLING ATTACHMENT

Fits milling machines with 3" to 5" overarm.

3/4" end mill capacity.

For vertical, horizontal and angular operations.

**RUSNOK**

**RUSNOK TOOL WORKS**

4840 West North Ave., Chicago 39, Ill.

DEALERS IN ALL PRINCIPAL CITIES

**MILLING • DRILLING • BORING**

Circle No. 356 on Card, Opposite Page 65

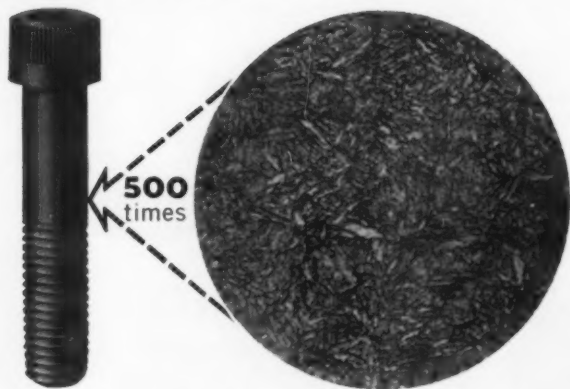


operative or can provide two different types of table operation.

When the panel switch is set for straight production sawing, a touch of the toe on the foot control inaugurates forward or feed motion at a rate and pressure which has been preset on the instrument panel. Return stroke, obtained by depressing the opposite pedal, is at full speed.

Many times, in negotiating complex curves in contour sawing jobs, it is

## MAC-IT SCREWS HAVE GUTS!



This is a photomicrograph of a Mac-it Socket Head Cap Screw—enlarged five hundred times! The super-fine, uniform grain structure means that Mac-it Screws won't fail even under brutal shock or jarring vibration. It also means extra strength, often permitting safe use of smaller or fewer fasteners. Many Mac-it users report: "These screws outlast all others and withstand far tougher punishment than we hoped possible."

This fine grain structure results from careful selection of the finest alloy steel and precision, thorough heat treatment—standard for all Mac-it Screws.

Mac-it goes to all this trouble to give you the finest fastener money can buy. Your local distributor stocks a wide variety of Mac-it screw types and sizes. Ask him for free samples and literature, or write:

*Mac-it Screw Division*

**STRONG, CARLISLE & HAMMOND COMPANY**

1392 West 3rd Street • Cleveland 13, Ohio

Circle No. 357 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

**You Get These  
Exclusive Safety  
and Handling Features**

with all

# SUPERIOR DIE SETS

**Large Sets No Longer Need Be Blocked  
... Small Sets Can Be Lifted Without  
Sliding.**

Three features exclusive with SUPERIOR DIE SETS permit rapid assembly, disassembly and overall handling of large and small die sets. In addition they provide safety insurance ... protection for the skilled hands of die makers and handlers ... protection also against the ruining of costly dies in handling, or even damaging of valuable press equipment. Write for FREE 24 page Catalog on Superior Die Sets and Supplies.

**For Fast Local Service Call these Expert Superior Representatives**

Kalamazoo, Mich.—Phone 5-7988  
Indianapolis, Ind.—BRoadway 5668  
Chicago, Ill.—RAndolph 6-8871  
Dallas, Tex.—Rive side 5138  
Rockford, Ill.—Phone 3-3932  
St. Louis, Mo.—JEfferson 5-1223  
Milwaukee—MItchell 5-6027  
Orange, N.J.—ORange 5-5810  
Dayton, Ohio—Hemlock 6209  
Memphis, Tenn.—Phone 33-7727  
Cleveland, Ohio—KENmore 1-2015  
Eau Claire, Wis.—Phone 2-3453  
Minneapolis, Minn.—FR 1-1321  
Winter Park, Fla.—Phone 5-0464  
New Haven, Conn.—LO 2-1731  
Brooklyn, N. Y.—NAvarre 8-6690

**PLANTS AT**

Milwaukee, Wis.—MItchell 5-6027 and  
Plainville, Conn.—SHerwood 7-2701

**SUPERIOR** STEEL PRODUCTS CORP.  
2734 S. 19th ST. MILWAUKEE, WIS.



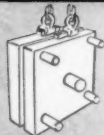
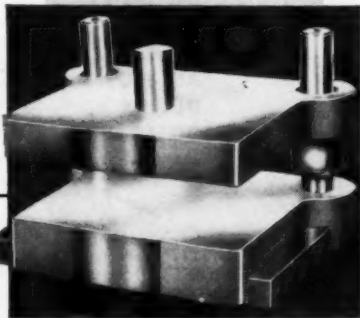
**SAFETY FLANGE**

protects fingers by providing roomy gripping space on either side of the die shoe. There is no extra charge for this valuable safety feature.



**LOCK-JAW LIFTING DEVICE**

removes the danger of handling large die sets. Positioned to insure proper balance when the set is lifted by either chain fall or crane.



**E-Z LIFT SLING CHAIN**

is especially designed to fit the flanges of the die sets. Male jaws attached to the sling fit quickly into place for immediate lifting.

necessary to stop the table feed or reverse it carefully to permit sawing of the workpiece. The foot control makes this possible while leaving the operator's hands free to manipulate the contour control and steady the workpiece. With the operation switch on the instrument panel set at "contour," return motion is at the same speed as the feed motion. The DoAll Co., Des Plaines, Ill.

Use ACTION Card, opposite page 64. Circle No. 106

## Face mill cutters have "throw-away" inserts

A line of face mill cutters designed around an elevator toolholder principle feature the use of "throw-away" carbide inserts. When the cutter is dull, all inserts are indexed to new cutting edges in a matter of a minute or two without the necessity of gauging each tooth to assure uniformity of the edges. When the cutting edges are used up, the in-

## BREEZY COMFORT FOR HOT SUMMER DAYS!

**Mounts on Machine Tools, Bench or Wall**

INSTANTLY  
ADJUSTABLE  
TO DIRECT  
AIR FLOW  
IN ANY  
DIRECTION

FRITIONALLY  
ADJUSTABLE  
UNIVERSAL  
DISC JOINTS



COLLAR  
DISC JOINT  
TURNS 180°

UNIVERSAL BASE  
FOR HORIZONTAL  
OR VERTICAL MOUNT

INCREASES  
INDIVIDUAL  
WORKER  
MORALE  
OUTPUT  
ACCURACY

## FOSTORIA LOCALFAN

**MOTOR** — Powerful 2 pole single speed, quiet and smooth running. Toggle switch.

**FAN** — Four 8" deep-pitched aluminum blades with nickel plated guard. Non-oscillating.

**WIRING** — 8 ft. SFT-2 18/2 heavy duty plastic rip cord with molded 2 prong plug.

**FINISH** — Semi-gloss Vista Green baked enamel motor housing, arm and base.

**\$12.45 List \$10.60 ea. in Pkg. of 4**

**THE FOSTORIA PRESSED STEEL CORP.  
FOSTORIA, OHIO**

**FREE!**

Page after page shows  
the correct abrasive wheel to use  
(for the best Blanchard grinding results)



Blanchard wheels in silicate, resinoid and vitrified bonds.



This is our famous booklet *The Art of Blanchard Surface Grinding* — brought up-to-date with a third edition. It contains complete descriptions of our silicate, resinoid and vitrified bonded wheels. It also describes a number of jobs and shows you how to select the correct wheel for each job. Every Blanchard operator should have a copy handy — send for yours today.

Blanchard wheels are guaranteed for uniformity of grade. They're best for Blanchard grinders, best for every job. They give you maximum production, utmost economy . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

PUT IT ON THE

**BLANCHARD**

**THE BLANCHARD MACHINE COMPANY**

64 STATE ST., CAMBRIDGE 39, MASS.

THE BLANCHARD MACHINE CO.  
64 State St., Cambridge 39, Mass.

MTB

Gentlemen:

Please send me a free copy of "The Art of Blanchard Surface Grinding" (3rd Edition).

NAME .....

FIRM .....

STREET .....

CITY.....ZONE.....STATE.....

Circle No. 360 on Card, Opposite Page 65



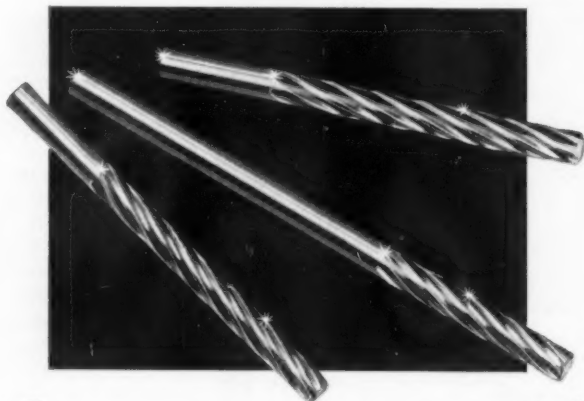
serts are thrown away without re-grinding, and a completely new set can be installed in a matter of moments.

Available in 4", 6", 8", and 10" diameters. Vascology-Ramet Corp., Dept. RB, Waukegan, Ill.

Use ACTION Card, opposite page 64. Circle No. 107

### Bender has two spindles

The Bend-All two-spindle bender may be used for bending wire, strip, bar, angles, channel, tubing. It produces



*Get smoother, more accurate holes*  
with "ground-from-the-solid"

## ACE *Drill Length and Chucking* REAMERS

More holes faster... and at lower cost! That's what you get from Ace Drill Length and Chucking Reamers! They're made of pre-hardened H.S.S., produced by the Ace "ground-from-the-solid" process. This gives them their highly polished right-hand spiral flutes... plus keener, longer-lasting cutting edges. They're economical to use... particularly the drill length reamers which can be re-ground more times for longer useful life. Next time you need reamers, ask your distributor for "ACE".

A 56 PAGE, illustrated catalog (No. 52-F) containing complete information on the entire line of ACE Drills and hardened H. S. S. drill blanks is yours for the asking. Send for it today!



**ACE DRILL**

ADRIAN, MICHIGAN

ORIGINATORS OF "GROUND-FROM-THE-SOLID" DRILLS

Circle No. 361 on Card, Opposite Page 65

# *Glenzer* **LIVE CENTERS**

**THEY'RE  
SHOCK-  
PROOF**



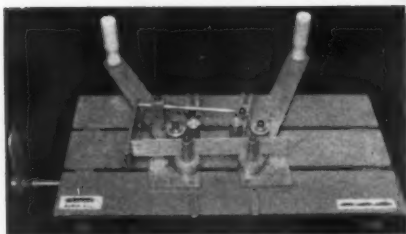
These Precision-Built Live Centers are especially designed to absorb the shocks that are bound to occur in all machining operations, due to heat expansion. Three-layer resilient pads automatically absorb this expansion. This relieves any excess pressure on the Timken bearing, which seats on these pads.

#### **REDUCE TOOL BREAKAGE!**

For longer tool life and frictionless drive, specify Glenzer Live Centers! They've been proven by the test of time.

THE J. C. **GLENZER** CO. Inc.

1546 E. NINE MILE ROAD, FERNDALE, DETROIT 20, MICH.



two bends at one time. No shifting of material.

Adjustable center, adjustable stops, and adjustable for different wire gauges. Can be used as an end bender. Tri Machine and Tool Co., Dept. MG, 227 Centre St., New York, N.Y.

Use ACTION Card, opposite page 64. Circle No. 108

### Semi-finished cutter blanks

Standardization of cutter blank sizes at Niagara Cutter Div., Dept. RH, 367 Schenck St., North Tonawanda, N.Y.,

## NELCO CARBIDE TIPPED MILLING CUTTERS...

### CUT YOUR OVERHEAD!

**You DON'T grind steel with a diamond wheel—when you use NELCO Cutters!**





All carbide cutting surfaces overhang steel body!



NELCO sandwich braze guarantees a rugged, one piece cutter that works to close tolerances, can't chatter, teeth don't work loose!



NELCO pioneered slush milled design—gives more chip clearance—means less grinding



Gang cutting made simple—slot, maintain width with multiple cutters and shims!

Those who buy tools for lasting performance as well as initial appearance always specify "Nelco". These carbide tipped Milling Cutters are precision built for rugged dependability, engineered to "take it"—singly or in gangs—to save *real money*, deliver fast and accurate results without the operational and maintenance "headaches" of most conventional cutters. Look for benefits and appearance—call for Nelco—your distributor has the size and type you need in stock.

**SEND TODAY for complete catalog**



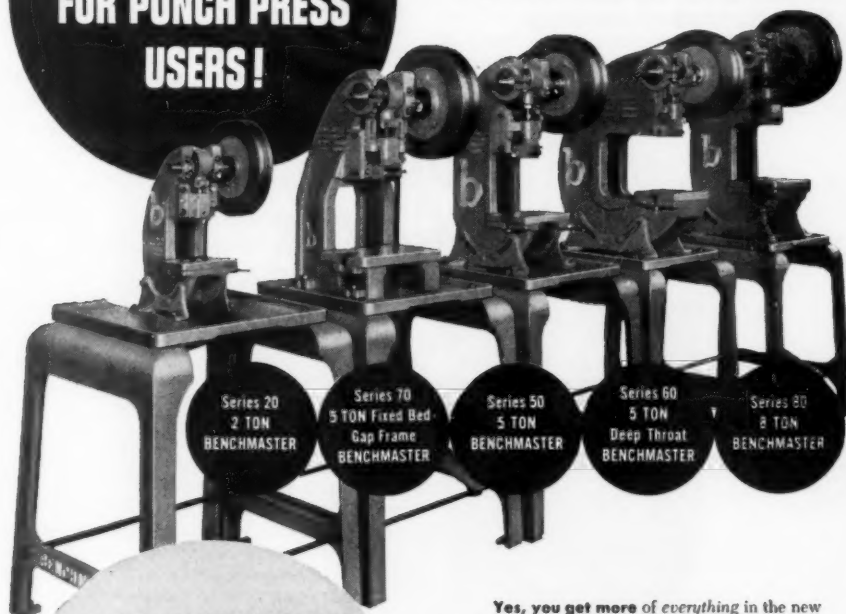
# NELCO TOOLS

NELCO TOOL CO., Inc. • Manchester, Conn.

*For that **EXTRA** Edge in Production!*

**BIG NEWS!**  
**FOR PUNCH PRESS**  
**USERS!**

A complete NEW Line of Low Cost  
**benchmasters**  
with **INCREASED TONNAGE!**



Series 20  
2 TON  
BENCHMASTER

Series 70  
5 TON Fixed Bed  
Gap Frame  
BENCHMASTER

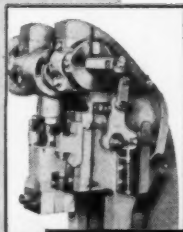
Series 50  
5 TON  
BENCHMASTER

Series 60  
5 TON  
Deep Throat  
BENCHMASTER

Series 80  
8 TON  
BENCHMASTER

**LATEST IMPROVEMENT!**

Benchmaster is now equipped with this oversize sliding key type clutch dogs contained in a husky hardened steel collar...takes load off the crankshaft keyway—insures trouble-free performance for years to come!



**Yes, you get more of everything in the new Benchmasters.** More experience, more performance, more satisfaction, more improvements, and now a great new addition...**MORE TONNAGE!**

Benchmaster's brand new line includes a whole new series of presses, partially illustrated here, available in both plain and back-gear types as well as half-presses.\*

See these at your dealer's and compare prices. You'll see why Benchmaster has been America's favorite punch press for nearly two decades!

\*2 Ton in Plain O.B.I. Type only

1835 W. Rosecrans Avenue  
Gardena, California

**benchmaster**

World's largest  
manufacturer of small punch  
presses and mills.

offers wide application for special and semi-standard cutter designs. Intermediate sizes may be reworked from standard blanks before hardening.

A variety of formed milling cutters may be processed from these partially completed cutter blanks.

Use ACTION Card, opposite page 64, Circle No. 109

### Concentrated cutting coolant

K-1000 is a special machining coolant

developed for use in the Mystic Mist coolant systems manufactured by Aetna Mfg. Co.

It forms a clear, stable, water-white suspension in water, which is non-irritating and non-toxic.

By increasing the concentration of the coolant, severe work can be done with the Mystic Mist. Manufacturer of K-1000 is the Keil Chemical Co., Dept. RB, 315 N. Leavitt, Chicago 12, Ill.

Use ACTION Card, opposite page 64, Circle No. 110

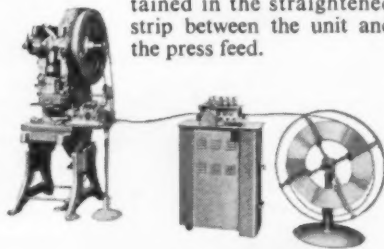
## Economy • Dependability

### WITTEK

#### STOCK STRAIGHTENERS

Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.

This typical Wittek automatic production feeding setup includes — Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.



Write for full particulars

**WITTEK Manufacturing Co.**

4321 W. 24th Place • Chicago 23, Illinois



Circle No. 365 on Card, Opposite Page 65

### Three new arcwelding machines announced

Three new arcwelding machines—a dc rectifier, an ac/dc rectifier for metallic arcwelding and an ac/dc Heli-welder for inert gas and metallic arcwelding—are available from Air Reduction Sales Co., 60 E. 42nd St., New York 17, N.Y.

The DC Bumblebee arcwelder has

improved selenium rectifiers designed especially for welding service to convert alternating current to direct current. It features a single range of current adjustment. New low design permits stacking for parallel operations; weather-proof construction for outdoor operation; transformer design produces instantaneous voltage recovery and control resulting in an easy-to-handle arc; forced draft ventilation assures low

# CYCLONE SEPARATION

**FOR MORE EFFICIENT DUST COLLECTION — FILTERS LAST LONGER**



Almost all industrial dusts can be collected more efficiently by Dustkop. Thirty-seven standard models *ready to use!* Reduce installation costs — save space. Write for descriptive literature.

**ALSO A COMPLETE LINE OF MIST COLLECTORS**

**DUSTKOP<sup>®</sup> STOPS DUST**

**AGET MANUFACTURING COMPANY**  
1382 EAST CHURCH ST., ADRIAN, MICH.

Circle No. 366 on Card, Opposite Page 65

operating temperature. Available in 200, 300 and 400 ampere models.

The ac/dc rectifier is designed specifically for metallic arcwelding and will supply either ac or dc current by the flick of a switch. Patented control circuit eliminates need for any mechanical type control and selenium rectifiers are specifically designed for welding duty. Both ac and dc welding ranges are wide and a rheostat gives micrometer current control within each range

of the 3-position switch. Available in 200, 300 and 400 ampere models, with or without power factor correction.

The ac/dc Heliwelder machine is available in 200 and 300 ampere models. It is designed for use with the various inert-gas arcwelding processes in addition to metallic arcwelding. Machine consists of a single-phase transformer, selenium rectifier and stabilizing reactor, permitting the operator to select either ac or dc welding current. High



Buy C/R Jawhead hammers, mallets, mauls from your local industrial supplier, or write for illustrated folder.



**CHICAGO RAWHIDE MFG. CO.**

1223 Elston Ave. Chicago 22, Illinois

IN CANADA:

Distributed by Super Oil Seal Mfg. Co., Ltd.,  
Hamilton, Ontario

## be HARD-HEADED about "Soft" hammers!

You get more years of proved-in-use performance with C/R Jawheads than with any other soft hammer on the market. C/R Jawheads do more work with fewer blows . . . reduce worker fatigue, improve safety. They last longer and cost considerably less than most comparable "soft" striking tools. C/R Jawheads are the *best soft hammers you can buy*. Try 'em!

See these features — proved in use!

- Tough rawhide faces won't crack, spark, mar fine surfaces
- Threaded collar locks faces tight. They can't loosen, fly out
- Extra-long handles give greater striking power
- Oversize handle flare gives safe, comfortable grip



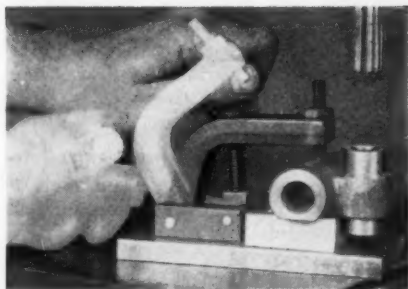
Circle No. 367 on Card, Opposite Page 65

frequency, with a rheostat control, is built in. Balancing resistor in series with transformer secondary provides correct current for inert-gas welding.

Use ACTION Card, opposite page 64. Circle No. 111

### Work-holding clamps position, clamp in one motion

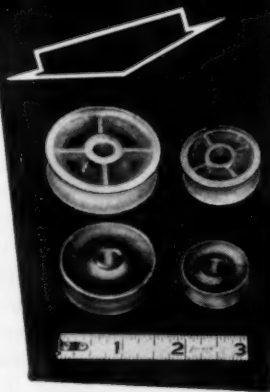
Work-holding clamps, available in four sizes each of four styles—hand knob, cam, nut or air operated—position and clamp in one motion. The un-



### CASE HISTORY OF A SHORT-RUN PLASTIC

## Nylon Pulley Saves Sailboat Manufacturer MONEY, WEAR and WEIGHT

Converting from a metal machined casting to a Nylon pulley enabled a maker of sailboats to eliminate scratching and nicking of the canvas top and lacquered wood surfaces of his boats. The self-lubricating Nylon pulley eliminated the oilite bearing-type metal pulley and saved overall pulley weight as well. Cost-wise, the customer can now buy, in thousand lots, two different size pulleys, molds included, for less than 1,000 each of the old metal pulley. Additional orders will be even less.



Plastic parts can save dollars and improve product usage. Consider short-run molded plastics for your product. Send a blueprint or sample for prompt quotation.

**DAYTON ROGERS**  
*Manufacturing Company*

MINNEAPOLIS 7C, MINNESOTA

Circle No. 368 on Card, Opposite Page 65

clamping and automatic retracting of the clamps is accomplished with another simple motion. It is not necessary to unclamp with one hand and pull the clamp away with another.

For high production jobs, the air actuated clamp can be made completely automatic so that the operator merely loads and unloads. Lodding, Inc., Dept. JP, 73 Beacon St., Worcester 1, Mass.

Use ACTION Card, opposite page 64. Circle No. 112

### Machine performs 1 to 100 operations

The Plymouth Enterprises, Inc., P.O. Box 87-B, Plymouth, Wis., has announced the development of an automatic machine called the "Sohn Robot" that will perform automatically from one to a hundred different operations throughout one continuous cycle. It will mill, drill, punch, gage, test, assemble, etc.

Use ACTION Card, opposite page 64. Circle No. 113

## suspension type

# FLEXIBLE SHAFT MACHINE

eliminates tooling problem for I.B.M.



International Business Machines Corporation had the problem of reaming holes .813" in diameter in the mounting hanger on the main base of their 407 Accounting Machine. To eliminate expensive tooling for this operation, they selected a STOW V50 portable flexible shaft machine, which was specially fitted with an on-off switch mounted on the handpiece.

The V50 machine delivers 1150, 2100, 3450, or 5750 RPM, is furnished with a 6 foot flexible shaft. Other speeds can be achieved by using different size pulleys. (I.B.M. ran the reamer at 750 RPM.) Available in either  $\frac{3}{4}$ , 1,  $1\frac{1}{2}$  or 3 HP, the

V50 can be used for grinding, buffing, sanding, wire brushing and drilling.

## STOW MANUFACTURING CO.

30 Shear Street

Binghamton, New York

Circle No. 369 on Card, Opposite Page 65



## Super finish for turbo-supercharger



A leading manufacturer of turbo-superchargers uses Osborn's Brushmatic® 3A to cut compressor wheel finishing costs from 48¢ to 16¢ per part.

\*Trade-Mark

THIS aluminum compressor wheel is the heart of a new turbo-supercharger designed to increase engine horsepower up to 60%. Osborn power brushing methods remove all machining burrs from this compressor wheel . . . maintain a finish tolerance of two ten-thousandths of an inch. In addition to improving the quality of this compressor wheel, Osborn power brushing cuts finishing time from 12 minutes to 4 minutes per part.

The automotive industry is just one of many using Osborn power brushing to improve and speed up finishing operations.

An Osborn Brushing Analysis, made in your plant, will show how you can improve finishes, reduce finishing costs. Write *The Osborn Manufacturing Company, Dept. L-20, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

# Osborn Brushes



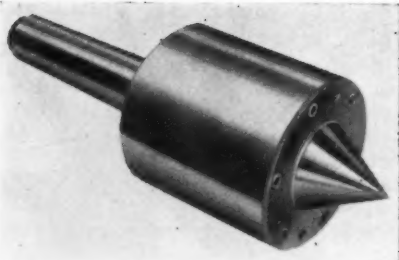
BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES  
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Circle No. 370 on Card, Opposite Page 65

## Heavy duty live center

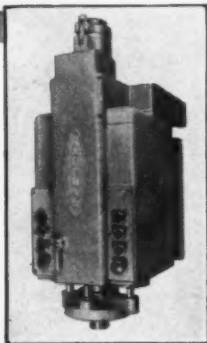
A heavy-duty live center, developed to withstand high radial and thrust loads while maintaining extreme precision, features an alloy steel shank and body with removable point. It is sealed against coolants and dirt entering bearing cavity. The Jergens Div., Donley Products, Inc., Dept. RH, 11106 Avon Ave., Cleveland, O.

Use ACTION Card, opposite page 64. Circle No. 114



## the all new VERTICAL or HORIZONTAL 101 taper

A brand new . . . Kaufman Tapper with more new operating, control, and production features . . . than has ever before been incorporated into a single tapping head. You can mount it vertically or horizontally . . . arrange it in combinations to do two or more operations . . . or mount it horizontal or angular in combination with vertical heads to do various operations simultaneously. Additional revolutionary features include:



- An extremely sensitive torque control . . . which signals overload, stops the machine automatically to avoid tap breakage.
- A pressure lubricated lead screw.
- Positive precision depth control.
- Air operated clutch with instant reversal.
- A simple non-reversing motor drive.
- Spindle speeds ranging from 35 to 785 RPM.

These and many additional features are incorporated into the new 101 Series Kaufman Tapper. For more complete information about this and other Kaufman Tappers, write

# KAUFMAN MFG. CO.

539 S. 29th Street

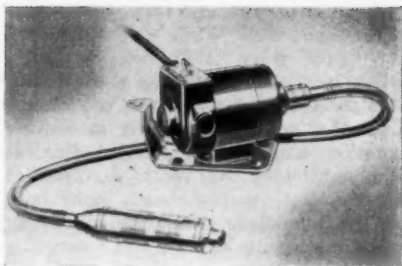
Manitowoc, Wisconsin

Circle No. 371 on Card, Opposite Page 65

### Flexible shaft tool

A high speed flexible shaft tool, the Super-Flex, is driven by a  $\frac{1}{4}$  hp universal motor that develops 22,000 rpm. The tool has the power to maintain a sustained torque under load, which is an ideal condition for carbide burr use. The shaft and sheath are the finest available for smooth, vibration-free operation.

Sheath consists of three layers—ar-

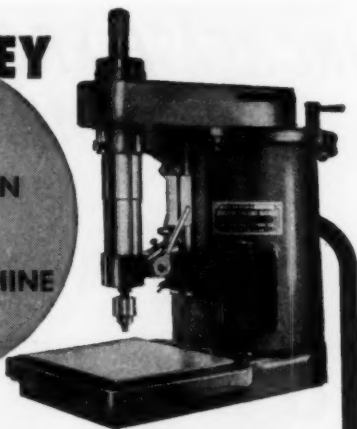


## SIGOURNEY

### M-100

*the* PRECISION  
BENCH

DRILLING MACHINE



No ordinary bench drilling machine, but an extremely accurate, high speed, sensitive machine for precision drilling. Drills from  $\frac{1}{4}$ " down to extremely small sizes. Successfully used down as far as .008".

Table and column exactly squared, one to the other, and built with strength and rigidity for maintained accuracy. Hardened and ground spindles insure long life. Sealed ball bearings throughout for smooth operation from 4,000 r.p.m. to 10,000 r.p.m. Motor, driving belt, and spindles entirely enclosed for safety. Available with 1, 2, 3 and 4 spindles.

### SIGOURNEY TOOL COMPANY

(Division of The Smyth Mfg. Co.)  
HARTFORD 6, CONNECTICUT



SEND FOR  
ILLUSTRATED  
BULLETIN

Pratt & Whitney, Sole Sales Agent

## PRATT & WHITNEY

Division Niles-Bement-Pond Co.---West Hartford, Connecticut

mored wire casing, wire braid and neoprene cover. While it is designed for heavy wear, it operates smoothly when bent to as small as a 6" radius. Around the spun wire shaft is a bronze liner that acts as a bearing to confine rotation within a confined radius. It also lubricates the shaft. A threaded adaptor spun to the sheath locks both to the handpiece. The freely rotating adaptor prevents kinking and entangling of sheath, eliminating constant adjust-

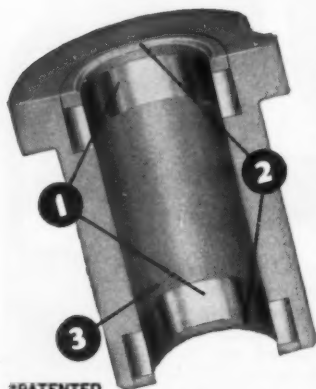
ment of work and position by the operator. Dumore Co., Dept. RB, Racine, Wis.

Use ACTION Card, opposite page 64. Circle No. 115

## Heavy duty cutting and gouging torch

The Model G-5 Arcair cutting and gouging torch is especially designed for heavy duty work and long service life. It features new, impact-resistant molded jaw insulators and a new

# INCREASE PRODUCTION.. SAVE TIME & MONEY



### \*PATENTED

1. Tungsten carbide rings at the points of wear; 2. Steel rings protect drills and carbide; 3. Special hardened alloy steel body.

For information and prices write for MEYCO Bushing Catalog No. 44

## MEYCO

### Carbide Inserted Bushings Are Doing It Daily!

How? Like this: (1) Last longer . . . with a life—in most cases—as long as solid carbide bushings at prices that approach the price of steel bushings; (2) Increased life for your drill jigs and fixtures; (3) Increased life for your drills and reamers; (4) Accuracy maintained for a LONG PERIOD of time; (5) Less non-productive machine time, less lost man-hours, because bushings need not be changed as often; (6) Inspection time saved, because of greater accuracy for a longer time; and (7) Less waste due to spoilage, for the same reason. Don't pass up a good bet! Get the dope on MEYCO Carbide Inserted Drill Jig Bushings today!



ESTABLISHED 1888

W. F. MEYERS CO., INC., BEDFORD, INDIANA

Circle No. 373 on Card, Opposite Page 63



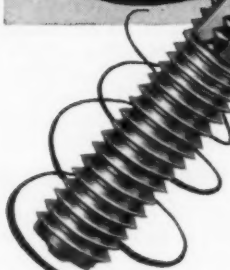
silicone glass laminate sleeve to protect the upper end of the handle from the heat. Torch will take up to  $\frac{5}{8}$ " diameter electrodes and delivers almost twice as much air as the previous G-3 model.

Operating from an ordinary dc welding machine and a compressed air line, this model features a rotating nozzle that permits changing electrode angle to suit the job. Air and current are brought to the torch through a concentric cable, permitting flexibility and ease of handling. Depth of cut and amount of metal removed can be closely controlled. Arcair Co., Dept. RH, 423 South Mt. Pleasant St., Lancaster, O.

Use ACTION Card, opposite page 64. Circle No. 116

## **Tap-Cartridges**

PERMIT TAPPING TO THE  
VERY BOTTOM OF THE  
HOLE...WITH NO  
ALLOWANCE  
FOR CHIP  
ROOM



### **CARTRIDGE TAPPING**

- Eliminates Chip Clean-Out.
- Increases Tap Life up to 5 or 10 times.
- Available in sizes from 0-80 up and for any drill depth.
- Available in blank, coil or strip form.

Cartridge Tapping consists of tapping into and through an extrudable tap cartridge (containing Carnauba Wax and High Grade Mineral Oil) which has been inserted (manually or automatically) into the drilled hole.

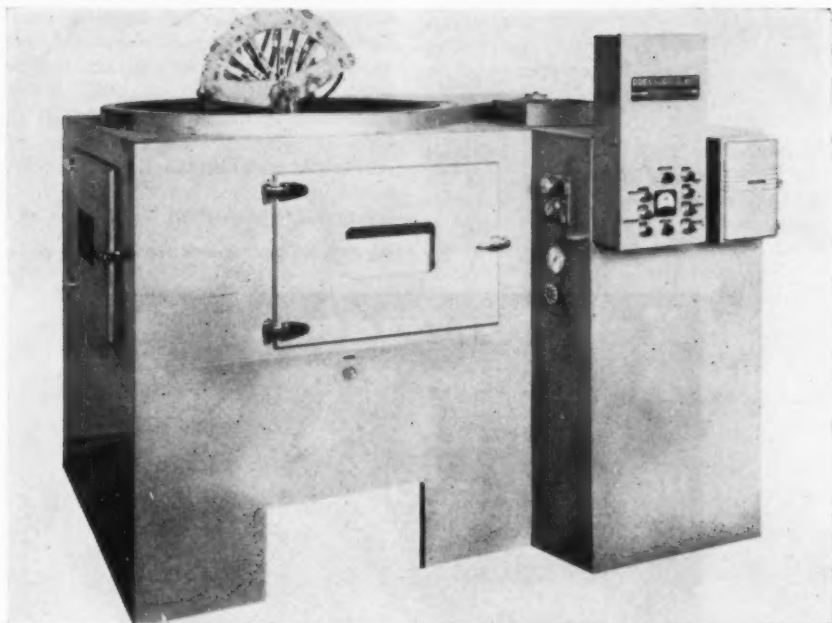
THE  
**TAP-CARTRIDGE**  
CO.

**YOUR SOLUTION  
TO THE BLIND  
HOLE TAPPING  
PROBLEM...**

2020 THOMAS ST. HOLLYWOOD, FLA.

Circle No. 374 on Card, Opposite Page 63

## Pressure Blast Wet Blast Unit



A new automatic pressure blast wet blast unit for the finishing of the interiors of large cylindrical sheet metal parts has been announced by The Cro-Plate Co., Inc., Dept. MG, 747 Windsor St., Hartford, Conn.

The unit was designed for a prominent eastern rectifier manufacturer faced with the problem of removing selenium deposits from the interior areas of "half-hemispheres" approximately 30" in diameter. Formerly, a nitric acid dip was employed which was discarded in favor of wet blasting because of the inefficiency of the process and the inability to reclaim the selenium metal. Wet blasting completely removes all excess selenium and imparts an absolutely basis metal clean surface.

In operation, the operator lowers the part on a circular bearing around the blast gun fixture. The bearing is ro-

tated by a variable speed drive and the gun fixture is moved back and forth by means of an air hydraulic cylinder. At the completion of the five minute cleaning cycle, work rotation and blasting automatically cease and the part is raised from the machine.

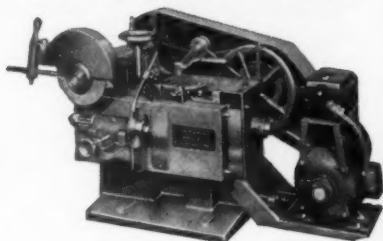
Use ACTION Card, opposite page 64. Circle No. 117

### Automatic stock feeds

Jaco-Matic feeds are made in three models to handle coiled stock in a range of widths in infinite increments up to 4", thicknesses up to 3/32" and with a range of feed stroke lengths up to a maximum of 4".

Micrometer adjustment allows feed stroke to be set to an accuracy of .001". Feeds are powered by the press ram and have a tungsten carbide steel gripper blade. They will advance stock on either up or down stroke of press ram

# Wardwell Saw Grinder, "35T"



Write for  
Bulletin 35T

**Sharpens Metal Saws  
in Gangs . . . Saves Money**

Sharpens up to 115 saws .015" thick at one time, better than new. Includes slitting and screw slotting saws, and milling cutters up to 5½" diameter.

Completely automatic. All you do is start the machine. It does the rest.

"35T" saves money for you by greatly increasing saw life. You owe it to yourself to investigate this remarkable machine.



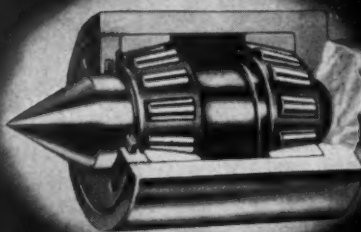
**WARDWELL MANUFACTURING CO.**  
3807 Ridge Road Cleveland 9, Ohio

Maker of largest line of saw and tool sharpening machines

Circle No. 375 on Card, Opposite Page 65

...precision performance-ALWAYS!

## Falls ROTO CENTER



for  
lathe and grinder  
tail stocks



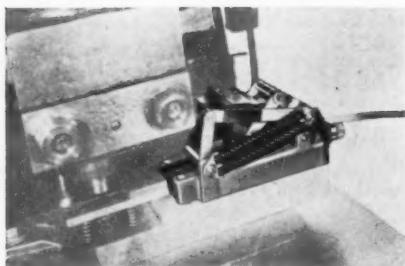
Accurate, low cost turning on tough continuous-run work. Preloaded, matched roller bearings assure rigid set-up. Precision ground shank. Heavy-duty grease seal. Many exclusive features.

FREE BULLETIN 105

"What you should know about LIVE CENTERS"

**FALLS PRODUCTS, INC., 122 Genoa Street, GENOA, ILL., U.S.A.**

Circle No. 376 on Card, Opposite Page 63



and will handle any kind of coiled stock. Soft material is not marred because the gripper blade lifts clear of the stock during the return stroke. **Jaco Devices, Inc., Dept. JP, 99 High St., Hingham, Mass.**

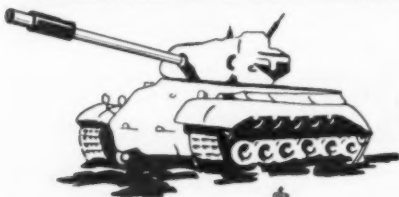
Use ACTION Card, opposite page 64. Circle No. 118

### **Dial indicators use hardened gears**

The gears, racks and pinions in Federal's new series "H" dial indicators

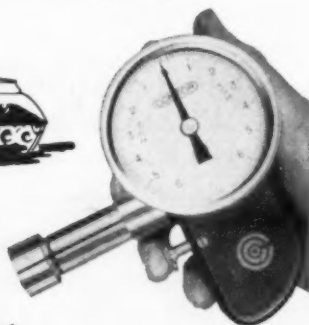
*Did you know that . . .*

## **Major ordnance items are quality-controlled with Comtorplug**



### **Precision Internal Gage**

**SIZES FROM  
1/8" to 8"  
AND LARGER**



## **COMTORPLUG with interchangeable expanding plugs to gage simple or special bores from 1/8" to 8" dia.**

### **UNIQUE ADVANTAGES**

Positive gaging accuracy to fraction of .0001" regardless of who operates it.

Indicates actual size, a fixed—not passing—reading.

Positive 2-point gaging — automatic centering.

Shallow holes, deep holes, inside pipes, open end holes gaged easily.

Detects ovality, back or front taper, bell mouth, barrel shape. Reaches to bottom of blind holes. Gages work while still held in chuck.

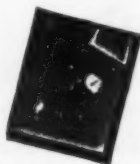
A shop tool for all-day every day use.

Portable — no wires, hoses or stands.

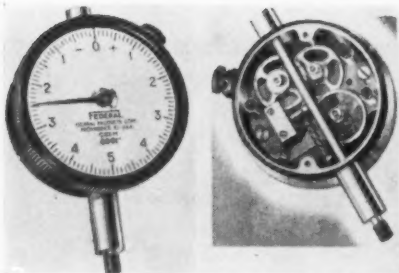
Investigate the gage used by the thousands in jet engine, guided missile, farm machinery, automotive transmission, household appliance, and other volume-precision plants. **IT MAKES PRECISION GAGING EASY . . . at machine . . . at inspection bench . . . for selective assembly.** No other like it—investigate and see why.

### **COMTOR CO.**

62 Farwell St.  
Waltham 54,  
Massachusetts



**GET THE FULL FACTS — REQUEST BULLETIN 49  
Circle No. 377 on Card, Opposite Page 63**



are precision hardened. This imparts durability to these vital parts and reduces the need for repairs.

Internal friction has been reduced from 16 to 25%, resulting in longer life, higher sensitivity and greater accuracy.

Indicators are available in the four AGD sizes, from 1-11/16" to 3 3/8" dia., as well as long-range and wetproof models. Federal Products Corp., Dept. JP, 1144 Eddy St., Providence 1, R.I.

Use ACTION Card, opposite page 64. Circle No. 119

**MOTORS NEVER NEED SERVICING!**

# Baldor GRINDERS

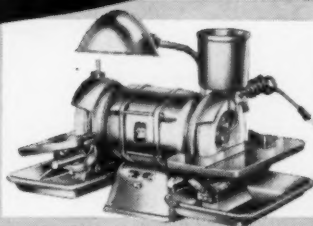
Lubricated for life ball-bearings never require servicing! Capacitor run motors withstand repeated overloading. Most rugged, durable grinders made!

- Totally enclosed, splash-proof motors protect against dust, grit, metal particles. Can't clog . . . can't cause trouble!
- Dynamically balanced for smooth operation, less vibration.
- Grinders for every need. 1/4 to 3 HP, 6" to 12" individually balanced wheels. Bench and pedestal types.
- All models fully guaranteed.

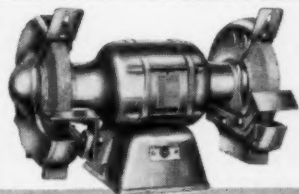
Write for Bulletin 321-N

**BALDOR ELECTRIC CO.**

4353 Duncan Ave. • St. Louis 10, Mo.



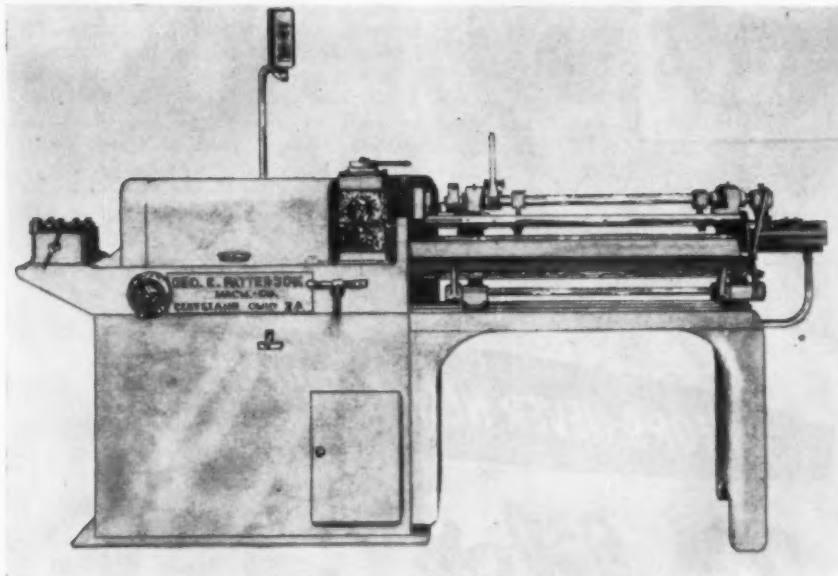
**Carbide Tool Grinder.** Specially designed for precision work. Reversible 1/2 HP motor, 3450 RPM, 1 1/2" wide wheels. **\$169.70**



**Model 153-8.** Provides maximum working room around wheel. Ideal for grinding long or odd-shaped pieces. 1/2 HP, 3450 RPM, 36 and 60 grit. **\$110.00**

Circle No. 378 on Card, Opposite Page 65

## Automatic Wire Straightening Machine



The Patterson Hi-Speed automatic wire straightening and cut-off machine straightens and cuts to length wire of various sizes, shapes and materials.

Line of machines handles wire of diameters from 1/16" to 1/4", from 1/16" to 5/16", and from 1/8" to 1/2".

A completely new clutch and trip mechanism makes it possible for the machine to handle wire of very small diameters. The Geo. C. Patterson Machine Co., Dept. KE, 3409 Trumbull St., Cleveland, O.

Use ACTION Card, opposite page 64, Circle No. 120

### Drill heads incorporate unusual design features

Top-flite drill heads will drill, bore, tap, or ream up to 12 holes in one stroke in an area up to 18 inches in diameter. Instead of adjustable arms, these heads feature interchangeable cluster plates jig-bored to customer requirements. Snap clips on the drive



# MARVECO

... has a very plain, simple guarantee. MARVECO live centers are guaranteed to outperform and outlast ANY OTHER LIVE CENTER MADE ... no ifs, ands or buts!

Compare quality and price — the best buy is MARVECO.

CALL YOUR LOCAL DISTRIBUTOR OR WRITE

**MARVEL TOOL & MACHINE CO.**  
1090 NO. RIVER ROAD ST. CLAIR, MICH.

Circle No. 379 on Card, Opposite Page 65

**BLUE VALLEY**

## FLANGING MACHINES

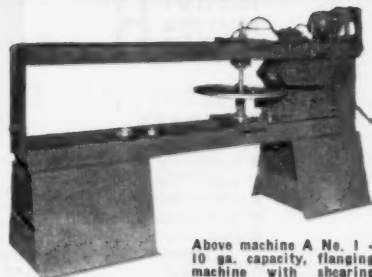
**No. 1** 10 gauge capacity combination circle shear and flanger; from 14" to 6' diameter flat with support; 12' diameter less support.

**No. 3** 1/4" capacity flanging flat heads from 18" to 12'.

**No. 4** 3/8" capacity flanging flat heads 20" to 12'; also handles standard dished heads up to 12' dia.

**No. 5** 1/2" capacity flanging flat heads 24" to 20'; also handles dished heads up to 12' dia.

**No. 6** 3/4" capacity for flanging flat heads 28" to 20'; also handles dished heads up to 12' dia.



Above machine A No. 1 - 10 ga. capacity, flanging machine with shearing attachments for shearing and flanging flat heads from 14" to 6 ft. dia. as shown. Will handle up to 12 ft. diameter by removing the angles at end of machine.

**No. 53** Elliptical Head Shear and Flanging Machine which operates from the same controls. Head is sheared to size and shape before flanging from same template without removing work from the machine.

**BLUE VALLEY MACHINE & MFG. CO.**  
6832 Truman Road KANSAS CITY 26, MO.

Circle No. 380 on Card, Opposite Page 65

spindles permit quick interchangeability for different hole patterns.

A steel reinforcing ban prevents the high-strength aluminum hood casting from cracking. The alloy steel gears are ball-bearing supported at both ends. The driver is supported by Timken roller bearings and designed to compensate for drill press spindle runout. Gears are enclosed in a sealed gear box. The heads can be operated hori-

zontally, vertically, or at any angle. Johnson Drill Head Co., Dept. RB, 23rd Ave. and 20th St., Rockford, Ill.

Use ACTION Card, opposite page 64. Circle No. 121

### Set master cylinders bolted together

In many plants it is difficult to keep track of set masters for checking micrometers. These instruments often are unchecked because of this.

Size Control Co., Div., American Gage

## HERE'S THE ANSWER TO YOUR TOUGHEST CUTTING PROBLEM

model **B**  
Metal Cutting  
Band Saw  
(Wet or Dry)

### FEATURES

- Large Capacity
- Portability
- Light Weight
- 3-Point Suspension
- Operational Safety
- Centralized Controls
- Speed and Accuracy
- Lowest Cost

The Johnson Model B . . . the only light and semi-portable metal cutting band saw with wide-range heavy duty capacity. The versatile Model B is fast—accurate and economical, it easily handles 5' rounds and 10' flats with automatic precision. It's available in the standard Dry or Wet models to suit the need and can be caster equipped for plant portability. See for yourself, why Johnson Saws are preferred—everywhere! Write today for catalog and name of local dealer.

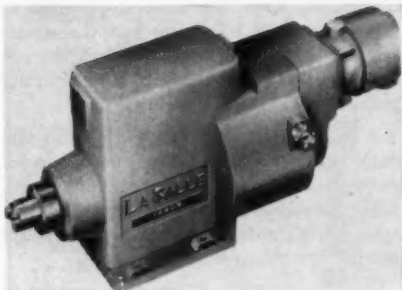
**Johnson** MANUFACTURING CORPORATION  
Main Plant—1012 Barnes St.  
Albion, Michigan

& Machine Co., Dept. RB, 2500 Washington Blvd., Chicago 12, Ill., has developed a set master consisting of six individual cylinders, bolted together for convenience, in sizes from 1" thru 6" in steps of 1". The actual size is marked on each section to 4 decimal places.

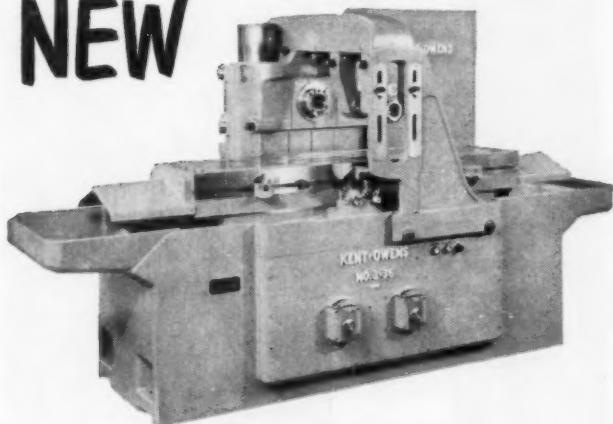
Use ACTION Card, opposite page 64. Circle No. 122

### Automatic power wrench

A two-speed, automatic power wrench with controlled torque is syn-



# NEW



## No. 3-36

### HYDRAULIC MILLING MACHINE

Now the new No. 3-36 in the Kent-Owens line of Milling Machines offers you the same unexcelled milling accuracy, speed and dependability for *larger size work*.

This ruggedly constructed miller has 36" table travel . . . 64" x 16" table . . . full automatic hydraulic feed. Write for full specifications. Kent-Owens Machine Co., Toledo, Ohio.

*Call on* **KENT-OWENS**  
**for MILLING MACHINES**

chronized with the machine cycle to give automatic engaging and disengaging of parts. The controlled torque eliminates the guesswork in clamping pressure.

A self-contained unit, it is automatically lubricated and operates on conventional machine tool principles—with high speed, low torque approach; low speed, high torque clamping; and high speed, low torque return.

The fluid motor drive enables you to

clamp light parts, or parts with thin-walled areas, without the danger of fracture. You can repeat the clamping torque from cycle to cycle within ten percent.

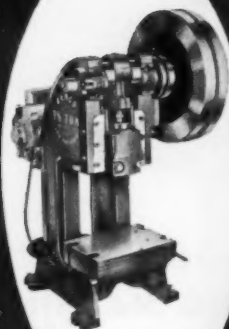
Two standard sizes are available; a smaller model, with a torque capacity from 0 to 800 inch/pounds; and a large model with a torque range from 800 inch/pounds to 5000 inch/pounds. La-Salie Tool Inc., Dept. JS, 3840 E. Outer Drive, Detroit 34, Mich.

Use ACTION Card, opposite page 64. Circle No. 123

## KENCO

1½ TO 15 TON

### PUNCH PRESSES



#### PRECISION-BUILT FOR FAST, TROUBLE- FREE PRODUCTION

Here at last is a complete line of small punch presses built to big press standards. You get rugged construction throughout... minimum need for adjustments... minimum downtime... capacity far beyond the ratings... steady, economical production.

Write for literature and engineering data.



Trouble-free crankshaft has no weakening slots... eliminates driving dog breakage. One-piece, alloy steel construction.



Flywheel driving plate is hardened and ground, assuring long wear and positive drive—a quality feature exclusive with KENCO presses.

### KENCO

MANUFACTURING CO.

Mfrs. of Precision Machinery and Accessories

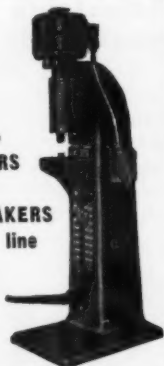
5211 Telegraph Road  
Los Angeles 22, California

Circle No. 383 on Card, Opposite Page 63

# GRANT

## RIVETERS . .

**PIONEERS  
and  
PACEMAKERS  
in their line**



—head rivets from smallest to  $\frac{3}{4}$ " diameter either by NOISELESS SPINNING or VIBRATING HAMMER method—sizes to meet all needs—types include Vertical and Horizontal Multiple Spindles

Write for literature and don't forget to send samples

**THE GRANT MFG. & MACHINE CO.**  
CE Station, Bridgeport 5, Conn.

Circle No. 384 on Card, Opposite Page 65

## ALL in ONE TOOLHEAD



**BORING  
FACING  
TURNING  
GROOVING  
UNDER-  
CUTTING**

**SIX SIZES  
AVAILABLE**

**All Have Power Feed  
for Facing**

**Write today for  
complete details.**

**CHANDLER TOOL CO.**  
Muncie, Indiana



Model "D"

COMBINED BORING & FACING TOOL HEADS  
**Chandler Duplex**

Circle No. 385 on Card, Opposite Page 65



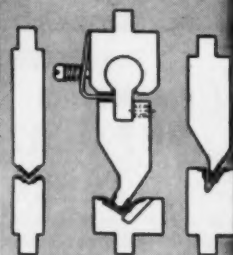
## INDUCTION HARDENED PRESS BRAKE DIES

**for greater die life at no extra cost  
on any make of press brake**

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO dies for your next press brake job.

4915

**Steel Bending Brakes for over 50 Years**



Heavy lines  
indicate  
hardened surfaces

# DREIS & KRUMP

**MANUFACTURING COMPANY**

7440 S. Loomis Boulevard, Chicago 36, Illinois



Circle No. 386 on Card, Opposite Page 65

## DO YOU MAKE?

- Plastic, Rubber or Glass Molds
- Forging or Die Cast Dies
- Contoured Parts for Ordnance or Aircraft



**YOU CAN SAVE  
UP TO 60%**

### The REGENT Fluid-Motion DUPLICATOR TABLE

39 out of 40 plants who purchased Regent Duplicator Table on a 15-day trial, sold themselves on its faithful performance.

#### MOUNTS ON ANY BRIDGEPORT MILL

Capacity 6" x 6" — 1 to 1 ratio with master. 2 or 3 dimensional with greatest accuracy. Single lever table control. Table "floats" on precision balls.

**SOLD ON 15 DAY TRIAL BASIS**

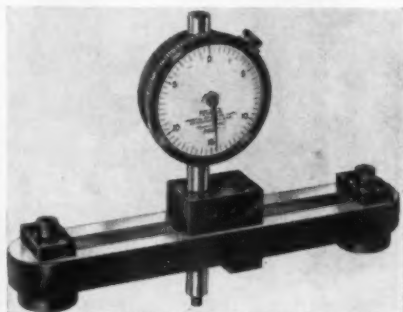
**J. M. KALINS & CO.**

1577 Railroad Ave., Bridgeport 5, Conn.

**REGENT**

## Adjustable depth gages meet needs of many jobs

A pair of versatile, adjustable dial indicator depth gages will gage a variety of conditions, such as slots, holes, recesses, grooves and keyways. Only two gages at the most will be needed to make the great majority of depth measurements on diversified products.



These gages, known as Models 75 P-10 and 75 P-11, will check depths from 0 to 1" and from 1" to 2". Specially shaped contact points and longer contacts are available.

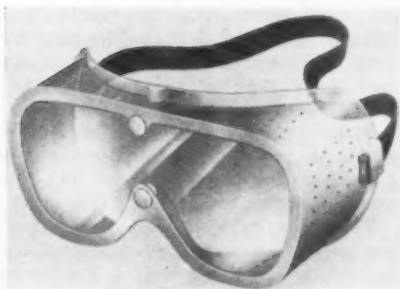
The cushioned movement dial indicator is easily adjustable vertically within the capacity of the gage and a locking screw assures that it will remain in position. An auxiliary plunger is used to relay the measurement to the indicator spindle. This plunger also protects the indicator spindle from eccentric loads and is keyed to prevent rotation while gaging. Federal Products Corp., Dept. JP, 1144 Eddy St., Providence 1, R.I.

Use ACTION Card, opposite page 64. Circle No. 124

## Safety goggles have vinyl plastic frame

Soft Side, single lens, Welsh safety goggles are used for light grinding, chipping and chemical operations. Frame is made of soft, pliable, vinyl plastic. Adapts to any size or shape of head. Deep frame design gives greater clear-

Circle No. 387 on Card, Opposite Page 65



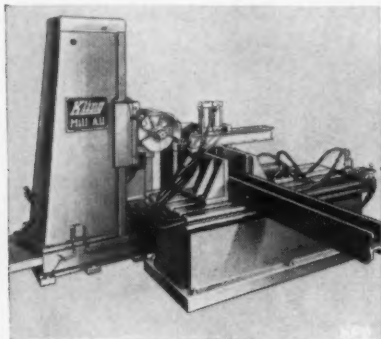
ance over prescription spectacles and fits snugly along temples.

Single piece, large, clear or green lens of impact resistant cellulose acetate provides unobstructed, wide angle vision. Vinyl lens available for chemical operations.

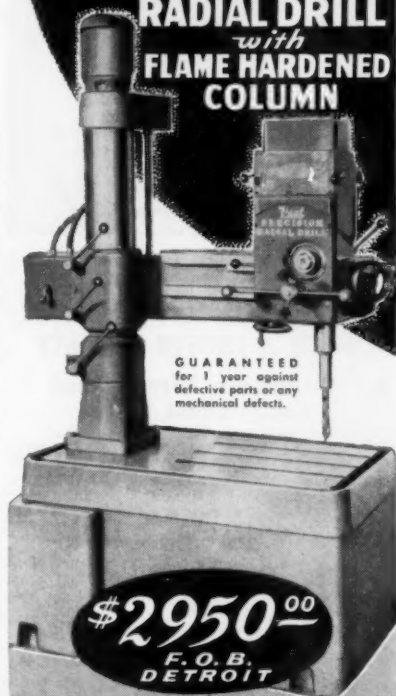
Available in four ventilation styles: regular perforations for average conditions; screened ports for extreme dust conditions; baffled ports for acid and splash conditions; no ventilation for vapor conditions. Welsh Mfg. Co., Dept. JP, 31 Magnolia St., Providence, R.I. Use ACTION Card, opposite page 64. Circle No. 125

### High speed face milling machine

The Kling Mill-All beam and column mill is designed to do a wide variety of facing jobs. Some of these are: face structural steel beams and columns and other structural steel sections and fabrications; face steel and iron castings,



## Cut Costs! with the Veet 3 Ft. PRECISION RADIAL DRILL with FLAME HARDENED COLUMN



GUARANTEED  
for 1 year against  
defective parts or any  
mechanical defects.

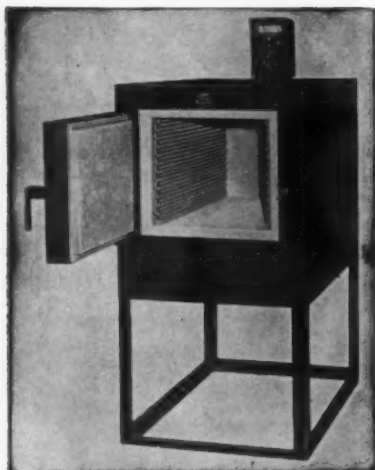
**\$2950<sup>00</sup>**

F. O. B.  
DETROIT

**PRICED AS LOW AS  
AN UPRIGHT DRILL!**

Send for our new brochure describing the 16 points of superiority of the VEET Precision Radial Drill.

MANUFACTURED BY  
**Veet INDUSTRIES**  
TELEPHONE PRescott 6-3000  
25753 GROESBECK HIGHWAY EAST DETROIT, MICH.



MORE THAN TWO THOUSAND SATISFIED USERS  
WILL TESTIFY YOU

## SAVE 3 WAYS WITH A LUCIFER FURNACE

### 1—Save on First Cost

#### CHECK THESE PRICES

Furnace Size	2000°	2300°
6x 6x12"	\$500.00	\$600.00
9x 9x18"	750.00	850.00
12x12x24"	1000.00	1100.00
18x18x36"	1500.00	1600.00

Complete with 100% automatic electronic controls.

### 2—Save on Man Hours

Less operator attention needed—Lucifer controls are EXACT. They reach SPECIFIED heat rapidly and retain SPECIFIED temperature without variation. No special experience required when you use a Lucifer Furnace.

### 3—Save on Maintenance

Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free.

WRITE FOR FREE LITERATURE, SPECIFICATIONS AND price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or phone today.

# LUCIFER FURNACES, INC.

NESHAMINY 1, PA.  
Phone Osborne 5-0411

forgings, weldments, die blocks, etc.; chamfer plates and bars. The machine may also be used for plate edging and can be adapted to mill aluminum and other non-ferrous materials.

Metal removal rates are from 40 to 80 cu. in. per minute. Horizontal cutter travel ranges from 72" to 144" and vertical cutter travel from 60" to 84".

The large, heavy carbide blades may be indexed to eight cutting positions before regrinding is required. The cutter spindle drive motor is 40 hp with 75 hp motor also available. Kling Brothers Engineering Wks., Dept. RB, 1320 N. Kostner Ave., Chicago 51, Ill.

Use ACTION Card, opposite page 64. Circle No. 126

## One-ton press for assembling, riveting, punching, marking

A new one ton Multipress has been developed by the Denison Engineering Co., Dept. RH, Columbus, O., for such operations as assembling, riveting, punching, marking, trimming, pellet-ing, compacting, testing, straightening, broaching, swaging.

It duplicates ram pressure every



Circle No. 389 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

stroke. Other features: precision ram alignment; fast cycle time; simple setup; ample daylight to adapt tooling; interlocked manual controls, eliminating accidental tripping of ram.

Press operates on 110 volts, 60 cycle single phase circuit. It can be wired for operation on 220 volt single phase. Hydraulic system is a single power unit that can be removed and replaced in a few minutes. Ram pressure, 500 to 2000 lb. It weighs 225 pounds and stands only 22 inches high.

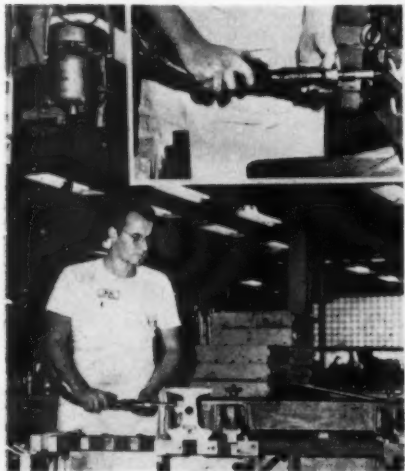
Use ACTION Card, opposite page 64. Circle No. 127

### Suspension type flexible shaft machine

The Model V50 multi-speed, suspension-type flexible shaft machine has a swivel mounting and a hook for hanging up or connecting to an overhead trolley.

The machine operates at four different speeds: 1150, 2100, 3450, and 5750 rpm. The speeds are easily changed since the countershaft pulley is mounted on an eccentric which makes it simple to loosen the belt and shift it on the step pulleys. Machine is available with either  $\frac{3}{4}$ , 1,  $1\frac{1}{2}$ , 2, or 3 hp motors. Stow Mfg. Co., 30 Shear St., Binghamton, N.Y.

Use ACTION Card, opposite page 64. Circle No. 128



ACTUAL SIZE



Attach this page to  
your letterhead and  
forward for our new  
16 page catalog

## CONICAL TOOL CO.

3801 Buchanan S.W.  
Grand Rapids 8, Michigan

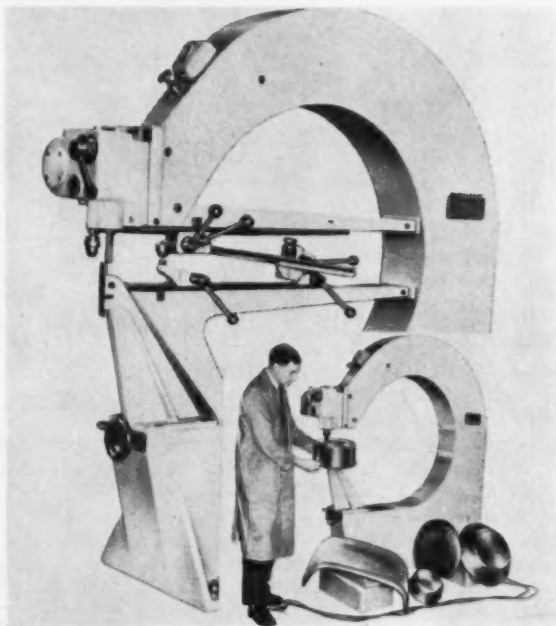
Circle No. 390 on Card, Opposite Page 65

## Versatile Pneumatic Trimmer

The American Pullmax Company, Inc., Dept. RB, 2455 N. Sheffield Ave., Chicago 14, Ill., has announced a trimmer with pneumatic operated head which can be raised 2".

The remote foot pedal makes it possible to raise and lower the head to engage and disengage the cutting tools while keeping both hands free for handling the work-piece. Guide bars can be detached when edge trimming a large stamping, center cutting a deep drawn stamping, etc.

page 64. Circle No. 129

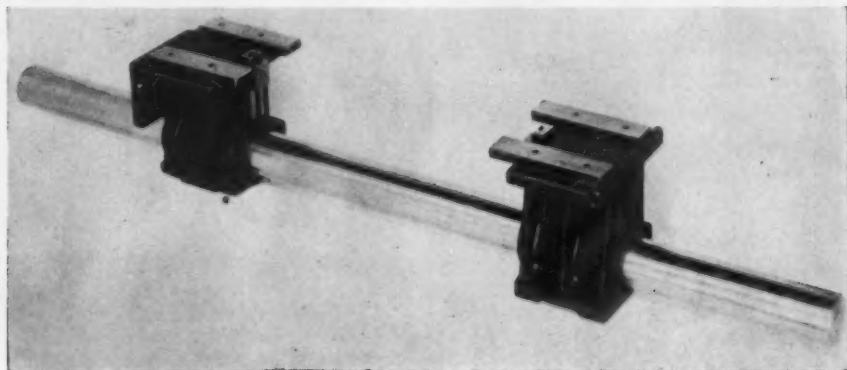


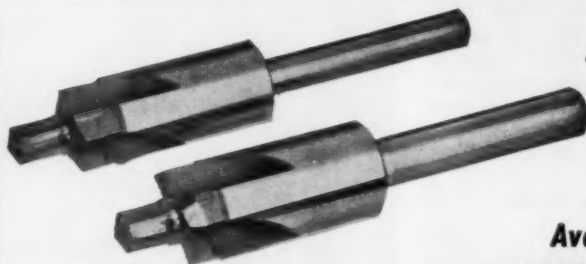
## Easy Setting Master Gage

Myer's Model M-100 Set-Master features reduced setting time and single design, including a variable adjustment depth contact. Fine adjustment is by key or wrench, which quickly brings

the settings to zero. If the desired setting is missed, it is only necessary to back off the contact and approach again.

A sliding contact button on each end may be set for 0" to 2" depth. The





## NOW... PORTING TOOLS

Available From Stock

**AND-10050**

Send for  
valuable  
data  
sheet

A complete line of carbide tipped combination ream, counterbore and facing tools to form AND-10050 standards. Tube sizes 2 through 24 in turret lathe and drill press types. Special tools made to order.

## WETMORE TOOL & ENGINEERING CO.

Engineers

Designers

Manufacturers

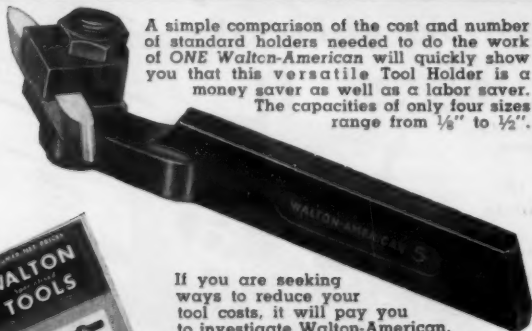
5318 E. Washington Blvd., Los Angeles 22, Calif.

AN 9-7266

Circle No. 391 on Card, Opposite Page 65

*Walton-  
American*

THE ONE "MULTI-POSITION"  
TOOL HOLDER REPLACING MANY!



A simple comparison of the cost and number of standard holders needed to do the work of ONE Walton-American will quickly show you that this versatile Tool Holder is a money saver as well as a labor saver. The capacities of only four sizes range from  $\frac{1}{8}$ " to  $\frac{1}{2}$ ".



The exclusive design of the Walton - American swivel head holds the tools in any position, giving perfect grip on round or square tool bits or boring bars. Illustration shows eight most commonly used positions.

If you are seeking ways to reduce your tool costs, it will pay you to investigate Walton-American. Write for Data Folder No. 12. We offer a liberal FREE TRIAL.



## THE WALTON COMPANY

HARTFORD 10, CONNECTICUT

Circle No. 392 on Card, Opposite Page 65

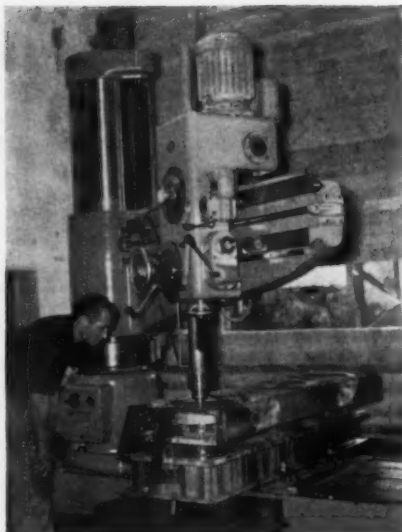
ranges for diameter setting are from 8" to 44" as standard. By the use of special-shaped contacts all types of datum checks may be made. Back pressure of the variable system assures control of the moving sensitive contact. The Myer Corp., Dept. JP, 45 Willard Ave., Providence 5, R.I.

Use ACTION Card, opposite page 64, Circle No. 130

### Radial drills

The Caser line of radial drills ranges in size from a 2'6" arm and 8" column diameter, to a 8' arm and 22" column diameter.

Features are: Single push button clamping of column and head; single control for power arm elevation; roller mounted head moves easily on arm; single control for spindle start, stop and reverse combined with pre-selection of all available speeds while machine is running; speed dial with direct reading of spindle speeds for pre-selection of next speed while machine



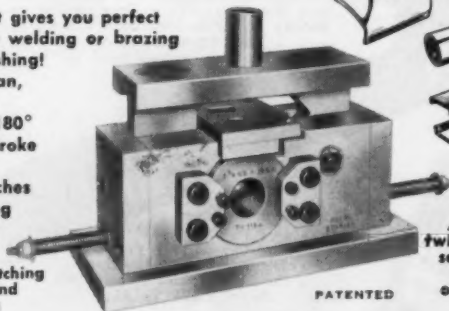
is performing first operation; feed dial with direct reading of all available feeds

## the **ARC-TWIN** *Cuts Two Perfect Notches* in One Downstroke of Press!

SAVING both time and cost, it gives you perfect T-joints — instantly ready for welding or brazing without deformation or finishing!

Twin-acting punch shears clean, from inside out, leaving two matching notches (in perfect 180° alignment) with every downstroke of the punch press. Quickly interchangeable dies and punches accommodate pipe and tubing from 1/2" to 2 1/2" O.D.; special units, up to 3" O.D.

Special Arc-Twins for double notching stainless steel or monel metal and units built to your specifications can also be furnished.



PATENTED

Ask for  
twin-notched  
sample of  
pipe  
or tubing

# VOGEL

## TOOL AND DIE CORPORATION

1825 North 32nd Avenue  
Melrose Park, Illinois

Circle No. 393 on Card, Opposite Page 65

can be operated while machine is running and feed is engaged.

Spindle speeds range from 8 in the smallest size to 24 in the largest machine. Marketed through the Maserati Corp. of America, Dept. MG, Westbury, N.Y.

Use ACTION Card, opposite page 64. Circle No. 131

### Machine for carbon-air cutting and gouging

"Carbonaire" is a machine designed by Hobart Brothers Co., Dept. RH, Troy, O., as a power source for the carbon arc-compressed air method of cutting and gouging all kinds of metals. It is rated 1000 amperes, on 85% duty cycle; or 900 amperes, on 100% duty cycle, at 36 to 54 volts.

The main current ranges are provided by four bus type cable terminals—one negative and three positive. The cutting torch cable is attached to low, medium, or high current to suit the



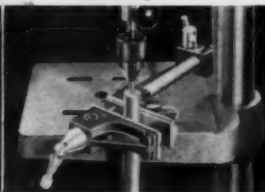
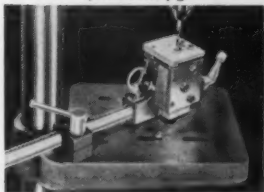
### AMF Float-Lock Instant-Change Vise makes drill press COMPLETE MACHINE TOOL



Positive anchoring... "Floats" and "Locks" in any position. Thumb-operated release ring permits instant change of jaw opening. Bosses on 2" centers provided on ratchet jaw for jig plates. Two models... 9" and 12" capacities. Special safety vise for band-saw also available. Send for complete literature now.

quick drill jig

centers long rounds



Another  Product

**Float-LOCK**  
SAFETY VISES

**AMF TOOL DIVISION**  
AMERICAN MACHINE & FOUNDRY COMPANY  
224 Glenwood Avenue, Bloomfield, New Jersey

Circle No. 394 on Card, Opposite Page 65

gouging or cutting job at hand. Arc voltage is adjusted by hand wheel.

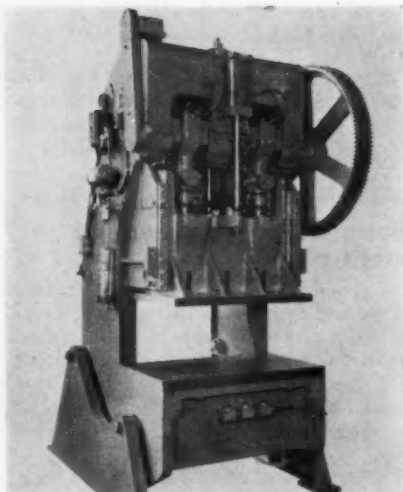
The standard unit is designed for use on electric power supply of 2 or 3 phase, 60 cycles, 220/440 volts (dual) or for 550 volts (single).

Use ACTION Card, opposite page 64. Circle No. 132

### **Double crank open back gap press**

This double crank open back gap press is mounted on separate legs so that the body of the press can, if desired, be set in an inclined position to make use of the open back feature for gravity discharge of the finished pieces.

The press, which is single geared, single end drive, is equipped with a single station electrically controlled air operated drum type friction clutch with spring loaded brake. The flywheel is fitted with an auxiliary air brake, to bring it to a quick stop when the power is shut off for any reason, and the slide is counterbalanced by air. A cen-



tralized manually operated lubrication system is provided within easy reach.

The press has a capacity of 250 tons,

## **PRECISION STARTS HERE:**

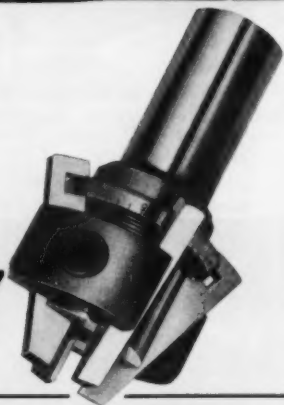
## **KUTMORE ADJUSTABLE HOLLOW MILLS**

- Any COMBINATION of . . . Turning . . . Tapering . . . Facing . . . Chamfering . . . Trepanning in ONE PASS.
- Exclusive MICROMETER Adjustment Feature For Rapid Set-Up.
- Area Sales engineers for your immediate Problems.

Write for Catalogue No. 20 MT

### **CARL WIRTH & SON, INC.**

1625 CLINTON AVE. NO.  
ROCHESTER 5, N. Y.



Circle No. 395 on Card, Opposite Page 65

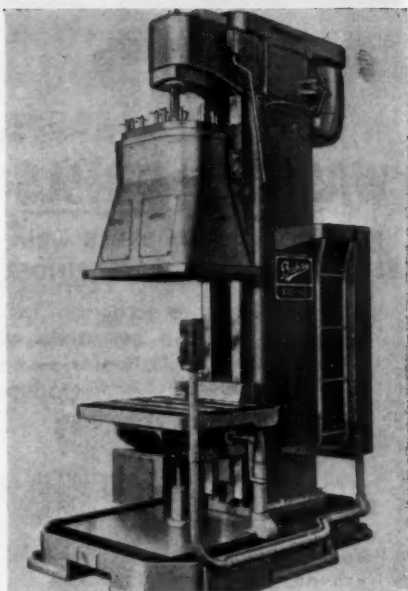
a stroke of 16", and a bed area of 42" x 72". A pneumatic cushion in the bed has a capacity of 42 tons at 100 lb. air pressure. The Cleveland Punch and Shear Works Co., Dept. RH, Cleveland 14, O.

Use ACTION Card, opposite page 64. Circle No. 133

## Hydraulic-feed drilling machines

A line of standard vertical universal-joint-drive hydraulic-feed drilling machines feature J.I.C. electrical and hydraulic standards which provide for full use of horsepower of the spindle-drive motor, while a separate motor drives the hydraulic power unit; hardened-and-ground steel ways; automatic lubrication of all moving parts.

Model VHU-12, has 12"-wide ways, 16" stroke and 7½ hp; VHU-18, 18"-wide ways, 18" stroke and 15 hp, and VHU-24, 24" ways, 24" stroke and 20 hp. Each is built with a wide variety of head sizes and spindle-drive arrange-



## INDEXING TURNTABLES

EISLER MOTORIZED TURNABLE CONTINUOUS SPEED TO SUIT YOUR WORK MADE IN MANY TYPES AND SIZES



Manufacturers' representatives wanted

**DR. CHARLES EISLER ME. FOUNDER, CHARLES EISLER JR. PRES.**  
**EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, New Jersey**

INDEXING TURNTABLE  
 6 POSITION GENEVA GEAR  
 MADE FROM 2 TO 24 STOPS

**C  
A  
M  
S**



Eisler makes over 100 different types of indexing mechanisms for spraying, glass insulators, melting and glass glazing with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 35 years. We supply any part or complete equipment and we make special turntables and cams to your specifications. You are invited to see our showroom and see for yourself our many models on display. Write or call for our new catalog No. 88-55.

# STOP WASTING DRILLS

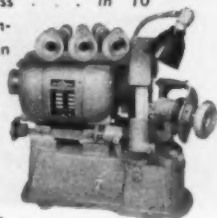
**NEW LIFE for OLD DRILLS with  
BLACK DIAMOND DRILL GRINDER**

**FOR DRILLS UP TO 3/4"**

The BLACK DIAMOND Drill Grinder restores a worn drill to like-new precision sharpness . . . in 10

seconds! Any inexperienced man (or woman!) is an expert grinder with this unit.

Both lips ground at once . . . web-thinning equally simple! Pays for itself many times over!



**FOR DRILLS UP TO 2 1/2"**

The WORCESTER Drill Grinder (now manufactured by Black Diamond) sharpens 2, 3, or 4-lip drills, flat, flat twisted or chucking, up to 2 1/2" Clearances are easily and instantly changeable, feeding is controlled by micrometer adjustment



## FREE BULLETIN

Get all the facts! 4 page illustrated bulletin gives complete story Write Today!



# BLACK DIAMOND

**SAW &  
MACHINE WORKS**

**77 NORTH AVE.  
NATICK, MASS.**

ments. Innumerable speed and feed combinations may be achieved. Buhr Machine Tool Co., Dept. JS, Ann Arbor, Mich.

Use ACTION Card, opposite page 64. Circle No. 134

## Plastic acid-etch marking stamps

These four styles of etching stamps, made from acid-resisting molded plastic, have been developed by Jas. H. Matthews & Co., 3946 Forbes St., Pittsburgh 13, Pa.: peg style, for most general use, in which the stamp is mounted on a rectangular or round wooden peg; dowel type, similar to the peg style with the addition of a special cap and self-contained ink pad, which fits on the stamping end; key-chain dowel style, also with a cap and self-contained ink pad, but for affixing to a key-chain; pocket-clip style, all-metal with a cap and ink-pad, and with a pocket-clip to enable the user to carry it on the person like a fountain pen.

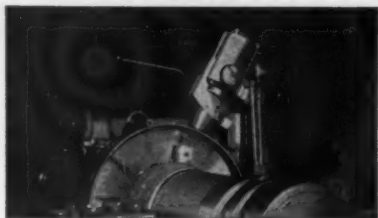


Acid-etch inspection and identification marking is used where the part to be marked is of a delicate nature or is made from a delicate material, or where the part is odd-shaped, making it difficult to mark with conventional methods.

Use ACTION Card, opposite page 64. Circle No. 135

Circle No. 397 on Card, Opposite Page 65

# INCREASE PRODUCTION...



Above is shown a 6M Fen Automatic Wrench operating a 28" heavy duty chuck.

## ELIMINATE "WRENCH WRESTLING"

You can put the advantages of the Fen Automatic Wrenches to your work right in your own shop on machines already in operation, or specify them on your new standard or automatic machines.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

**THE FEN  
MACHINE COMPANY  
28914 Lakeland Blvd.  
Wickliffe, Ohio**

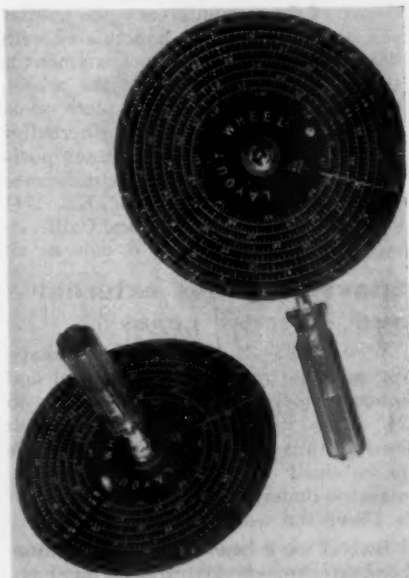
Circle No. 398 on Card, Opposite Page 65

## Layout wheel

This layout wheel provides both a measuring wheel and a conversion chart on the face of the wheel for quickly converting from diameter to circumference or from circumference to diameter. The wheel is calibrated in inches around its circumference. Also, it contains a number of concentric circles which are graduate in diameter figures.

A radial pointer is movable over the face of the wheel so that the side of the pointer can select the desired diameter on one of the concentric circles and the corresponding circumference can be read at the pointer on the scale around the wheel circumference. The pointer carries a figure opposite each of the concentric circles, so that the figure on the pointer opposite the diameter circle is added to the reading on the circumference scale to obtain the total circumference.

Since the pointer is a permanent



# ***Labor Saving* Production CHUCK**

**Will pay for itself in 60 to 90 days**

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.



*Write for bulletin 201 today.*

**CHUCK DIVISION**  
**THOMAS HOIST CO.**  
 24 S. HOYNE CHICAGO 12, ILL.

Circle No. 399 on Card, Opposite Page 65

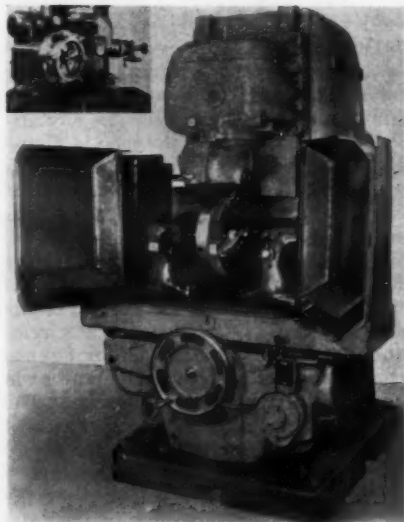
record of the circumference, the pointer can be left in position and rotated with the wheel. Thus, if the measurement is started at the zero line of the wheel, the required number of complete revolutions can be made and thereafter the wheel rotated to the pointer position to obtain the desired circumference layout. Idex Mfg. Co., Dept. KE, 1741 Fourteenth St., Santa Monica, Calif.

Use ACTION Card, opposite page 64. Circle No. 136

## **Shaver finishes external and internal gears**

Model GCP-24 Red Ring gear shaving machine for finishing external and internal spur and helical gears up to 24" pitch diameter is equipped with loading rails that enable external gears to be easily loaded in and out of the machine under the shaving cutter which is above the work.

Swivel work head and internal cutter head attachments are provided for shav-



ing internal gears. A hollow spindle in the work head permits the shaving of



• Write today for literature on complete line of Huppert furnaces and ovens in floor and bench models.

• Ask for Hints on Heat Treating.

## For Heat Treating Small Parts — HUPPERT — DeLuxe ELECTRIC FURNACES

Here's a series of compact, durable furnaces that are ideal for tool and die shops and small laboratories. Any desired temperature within the range of 300° to 1900° F. is controlled by an accurate,

built-in Huppert temperature controller. All-steel construction—multi-insulation—sturdy Kanthal elements—counterweighted doors—removable porcelain tray.

Model No.	Inside Dimensions			Temp. Range	Watts 110 Volts AC	Price
	Wide	High	Deep			
434DL	4 1/4"	3 3/4"	4 3/4"	300°-1600° F.	920	\$ 86.00
439DL	4 1/4"	3 3/4"	9"	300°-1600° F.	1650	115.00
436DL	4 3/4"	3 3/4"	6"	300°-1900° F.	1650	115.00
5DL	4 3/4"	3 3/4"	9"	300°-1900° F.	1750	176.00
9DL	6"	6"	6"	300°-1900° F.	2200	200.00
669DL	6"	6"	9"	300°-1900° F.	3000	248.00
10DL	8"	4"	6"	300°-1900° F.	2000	220.00
849DL	8"	4"	9"	300°-1900° F.	3000	265.00

Available for 220 Volt AC at small additional cost.  
Stainless steel housing slightly higher.

**K. H. HUPPERT CO.**  
6845 COTTAGE GROVE AVENUE CHICAGO 37, ILLINOIS  
Manufacturers of Electric Furnaces and Ovens

Circle No. 400 on Card, Opposite Page 65

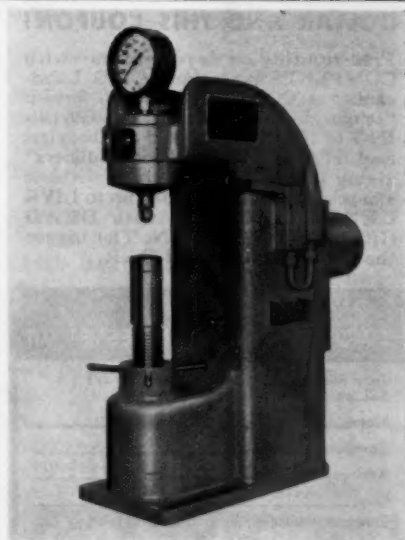
parts with integral shafts. Work may be swung out toward the operator for easy loading and unloading. The cutter on the internal cutter head is brought into mesh with the work gear and locked in one motion. The work gear drives the cutter when shaving internal gears. When set up to shave external gears, the cutter drives the work on the machine.

Machine will shave external gears from 3" to 24" pitch diameter in the 2 to 16 diametral pitch range. Internal gears from 6" to 24" pitch diameter in the same tooth size range can be shaved on the machine. Crown shaving is accomplished by the rocking table action. National Broach & Machine Co., Dept. JS, 5600 St. Jean Ave., Detroit 13, Mich.

Use ACTION Card, opposite page 64, Circle No. 137

### Brinell hardness tester

Designed for both laboratory and shop use, the Model L Brinell hardness



tester is a motor-operated hydraulic machine with finger-tip load applica-

**LIVE CENTER  
ACTION WITH  
DEAD CENTER  
ACCURACY**

**USE**



**ANTI-SCORING  
LUBRICANTS**



**PROVE IT TO  
YOURSELF IN  
YOUR OWN PLANT FOR ONE  
DOLLAR AND THIS COUPON!**

Free-running on dead centers—with **COMPLETE** protection. CMD Lubricants are **CONCENTRATED**, form a "tough" film—absolutely **NO GALLING** or **SEIZING**—under the heaviest load. **STABILIZED** for added "oiliness" giving longer, smoother runs without slip-stick action. It all adds up to **LIVE CENTER ACTION** with **DEAD CENTER PRECISION**. The bigger the job, the better you'll like it.

**TRIAL ORDER—  
TWO FOUR OZ. TUBES \$1.00**

Send me my order of CMD right away!  
Bill me ☐ Bill my company ☐

Name

Company Name

Address

City  State

Chicago Manufacturing and Distributing Co.  
1906 West 46th St., Chicago 9, Illinois

**CHICAGO MANUFACTURING  
AND DISTRIBUTING CO.**

Circle No. 401 on Card, Opposite Page 65

tion, long stroke to eliminate anvil height adjustments. The Brinell load, adjustable by turning a screw, is provided by a motorized hydraulic pump, with the oil reservoir contained within the machine frame. Operator applies the load by depressing a lever on the side of the machine, holding it down for the desired time interval. Releasing the lever instantly releases the load.

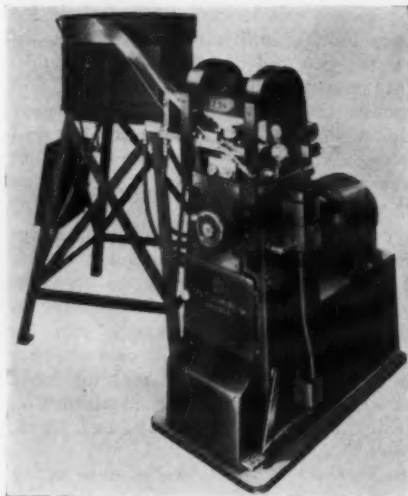
When testing a series of pieces of about the same thickness, it is not necessary to readjust the height of the anvil for each test. Steel City Testing Machines, Inc., Dept. JS, 8817 Lyndon Ave., Detroit 38, Mich.

Use ACTION Card, opposite page 64, Circle No. 138

## End cap marking

The Schmidt motor end cap marking unit has a hopper which is large enough for a 30 minute run. Marking rate: 1600 per hour.

The marking tool which mounts in the machine head consists of a radial



type and logotype holder to permit variations in marking, thus providing flexibility required. Set-ups for sub-

sequent runs can be made while machine is in operation. Geo. T. Schmidt, Inc., Dept. RB, 1802 Belle Plaine Ave., Chicago 13, Ill.

Use ACTION Card, opposite page 64, Circle No. 139

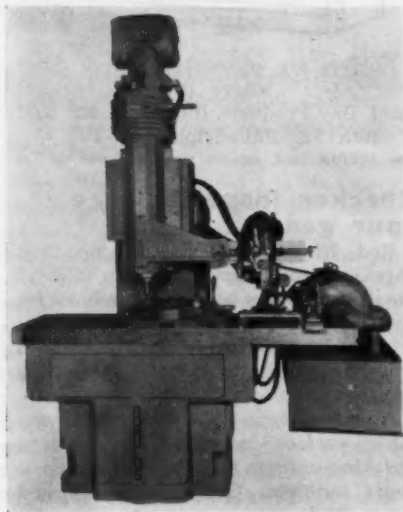
### **Finger-touch hydraulic milling in any direction**

A 3-dimensional hydraulic milling machine that operates with a constant horsepower, the Romulus 3-D Hydro-Cycle miller, features an all-hydraulic spindle with infinite speed selection.

Machine will mill left or right, forward or back, and up or down. It will cut circles to within 0.002 tolerance. Close tolerances are readily held in the finishing of deep cavities and pockets. Every die or part produced is semi-finished.

All movements are manually controlled by merely guiding a pencil-type stylus arm over the surface of the die or part which is to be duplicated. Spindle has a speed range of from 200 rpm to 2500 rpm. Standard heads are available up to 50 HP. Romulus Tool & Engineering, Dept. JS, 13581 Huron River Dr., Romulus, Mich.

Use ACTION Card, opposite page 64, Circle No. 140



# **LASSY**

**MASTER  
V-BLOCK**

## **ANGLE PLATES**

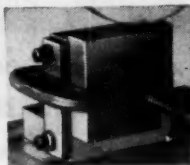
**Proven Time Savers!**

**A Master tool of versatility for every day use in . . . inspection and machining operations.**

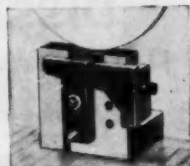
This Master V-Block Angle Plate is an improved new design. Saves hours of setup time. Assures precise work accuracy. Requires less skill.



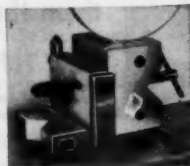
Side Gage automatically squares work precisely and without removing angle plate from chuck. Repetitive accuracy maintained.



Adjustable parallel holds the smallest work for position and clamping with ease and accuracy.



LASSY MASTER Angle Plate also provides a master setup for regrinding of worn or inaccurate Angle Plates.



**The LASSY MASTER Angle Plate is an indispensable tool precisely accurate and dependable.**

WRITE FOR ILLUSTRATED LITERATURE

# **LASSY**

**TOOL  
COMPANY**

**PLAINVILLE, CONN.**

Circle No. 402 on Card, Opposite Page 65



For easy, economical  
machine shop cutting  
use one of these 8 sturdy  
**DISSTON**  
**HACK SAW BLADES**

They cut easily... resist  
wear and breakage. Get  
them through your



**INDUSTRIAL  
DISTRIBUTOR**

WRITE FOR  
LATEST CATALOG AND  
HACK SAW SELECTOR  
TODAY.

**Henry DISSTON DIVISION  
H.K. PORTER COMPANY, INC.**

649 Tacony, Philadelphia 33, Pa.

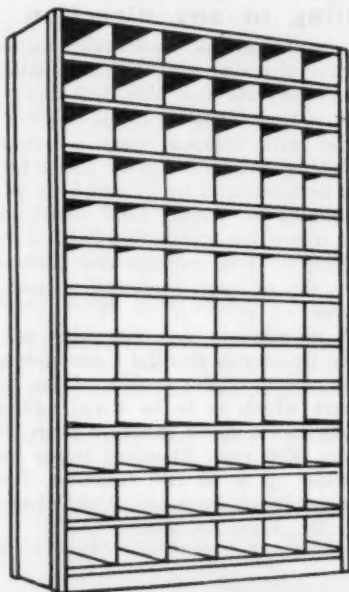


Circle No. 403 on Card, Opposite Page 65

280

## Bin units

Bay bin units, for storage and display of parts or small bulk or packaged items, have dividers which are adjustable horizontally every inch—no nuts, bolts or tools required.



Shelves are adjustable up and down every 1-1/2" where dividers are not used. Bay Products, Inc., Dept. RS, 3001 N. 16th St., Philadelphia 32, Pa.

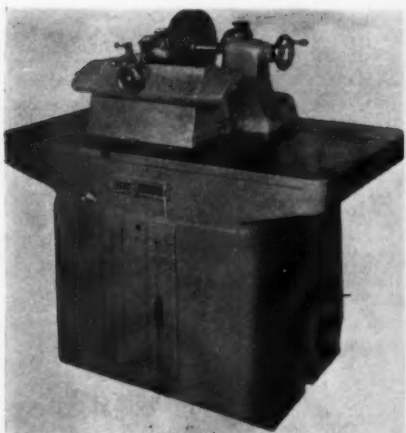
Use ACTION Card, opposite page 64, Circle No. 141

## Checker inspects large spur gears

Red Ring Model SIC-24 in. gear checker inspects spur gears up to 25 1/2" outside diameter as well as splines for accuracy of tooth size, spacing, eccentricity and parallelism. Spur gears and splined parts up to 11 3/4" between centers can be accommodated.

A unique type of slot design in the table surface positions the various checking units in straight line and right angle locations. Gears to be checked

MACHINE and TOOL BLUE BOOK



are mounted between centers on head and tailstock units that are slidably mounted through a slot in the top of a ribbed surface plate. Interchangeable heads are provided for checking eccentricity and size combination and tooth-to-tooth spacing. National Broach & Machine Co., Dept. JS, 5600 St. Jean Ave., Detroit 13, Mich.

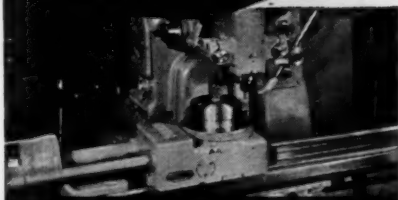
Use ACTION Card, opposite page 64, Circle No. 142

### Horning type press

This hydraulic horning type press with continuous automatic cycle broaches 30 external involute gear teeth on the o.d. of a bronze automotive synchronizer ring.

Broaches are mounted in a stationary broach pot, through which the part is pushed. Ten involute spline broach rings are mounted in the pot. The pot also acts as a guide for the push bar during the broaching stroke. An air operated automatic slide, interlocked to the machine cycle, carries the parts from the tube feed to broaching position over the broach pot. Stripping fingers and an ejection device automatically strip and eject the part below the pot. The parts are fed to the slide by a gravity tube feed. A single spline

## How To Increase Production And Improve Accuracy



### With a SUNDSTRAND Automatic Index Base

In many cases, the addition of this Automatic Index Base has increased milling production enough to eliminate need for the purchase of additional machinery. It may be the answer to your milling production requirements. Call in a Sundstrand engineer. There is no obligation for this service.

**Accurate  
Spacing,  
Powerful  
Clamping  
Insures  
Accuracy**



Sundstrand  
Automatic Index Base

This automatic index base is designed so there is no strain against the index plunger during the cut. The base is locked by powerful clamping so that accuracy of index is not affected by heavy cuts.

### Get Complete Data Free

This 8 page booklet contains production figures and specifications. Send for your copy today. Ask for bulletin 469.



**SUNDSTRAND MACHINE TOOL CO.**  
2535 Eleventh Street, Rockford, Ill., U.S.A.

**HIGHER SPEEDS!  
FASTER GRINDING!**

**kipp**

## AIR GRINDERS

MODEL JA  
50,000 R.P.M.

**\$42<sup>00</sup>**  
IN U.S.A.



Weight 12 ounces,  
length 6 $\frac{1}{4}$  inches,  
chuck size  $\frac{1}{4}$  inch.  
Wheel guard removed  
for better illustration.

The RPM's stay up while grinding . . . not only when the grinder runs idle. That means better work—longer wheel life.

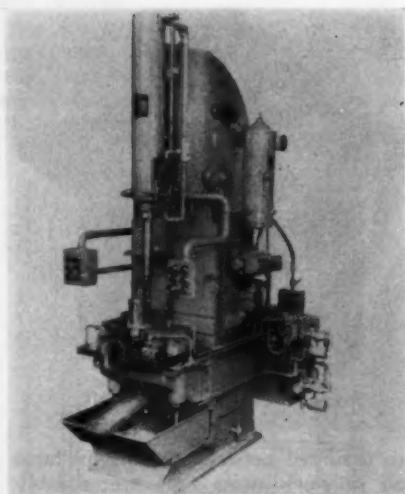
High speed grinding with small wheels was a Madison-Kipp development of the late twenties. It was born out of a pressing need in our tool room. Because tool room grinding problems are universal, we believe it will pay you to utilize Kipp grinders in your tool room as generally as we do in our own.

**kipp**

**MADISON-KIPP CORP.**

207 Waubesa St., Madison 10, Wis., U. S. A.

Circle No. 405 on Card, Opposite Page 65

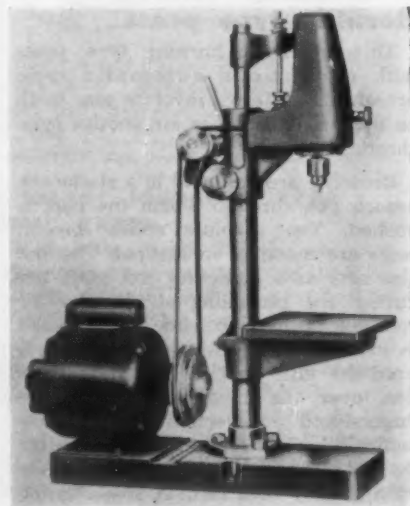


inside the tube radially locates the notched parts. American Broach & Machine Co., Dept. JS, 415 W. Huron St., Arbor, Mich.

Use ACTION Card, opposite page 64, Circle No. 143

### Sensitive drilling machine

The Class 8 drill is available with two drives, giving spindle speed ranges of



MACHINE and TOOL BLUE BOOK

either 2450, 2815, 3080 and 3540 rpm or 2450, 3630, 4810 and 6000 rpm. It drills to the center of a 6" circle, and has a 9/16" diameter spindle, spindle feed of 2 1/4". Distance chuck to base is 14" maximum, chuck to round table, 9 1/2". Occupies bench space 7" x 19" and stands 25" high. Capacity No. 80 to 1/4" drills.

Drill comes with 5 1/2" round table. Optional 6" x 8" rectangular table overlaps base to form continuous work surfaces when set up in gangs. High Speed Hammer Co., Inc., Dept. RH, Rochester, N.Y.

Use ACTION Card, opposite page 64, Circle No. 144

### Single solenoid air valve

Solenoid of this pilot operated, single solenoid 4-way valve has a dusttight enclosure. It is mounted on the cover so that valve is electrically inoperative when the cover is removed.



Valve is manufactured in 1/4", 3/8", 1/2", 3/4" sizes. Automatic Valve Co., Dept. JS, 37415 Grand River, Farmington, Mich.

Use ACTION Card, opposite page 64, Circle No. 145

June, 1956

**Only**



**have these exclusive\* features**

#### \*Standard Full Ball Bearing Construction, including Spindles

Driving assembly is Full Ball Bearing mounted with 3 Bearings on each spindle. Thrust load carried by radial thrust bearings.



#### \*Standard Slip-On and Slip-Off Template Construction

For accurate setting and locating spindle brackets are machined to receive slip-on and slip-off template.



6 Standard Models . . . Models U-608 and U-1000—Ball Bearing. Models U-620B and U-1012B—Plain Bearing, 11/16" or 1/2" min. centers. Models U-608-BS and U-1000-BS—Ball Bearing Gear Case, Plain Spindles.

Semi-Standard Heavy Duty Full Ball Bearing . . . 1/2" in Cast Iron—1-7/16" min. centers—7 1/8" or 9 3/4" dia.  
1/2" in Steel—1-13/16" min. centers—7" or 9 3/8" dia.

Also Larger Adaptations and Full Line of Fixed Center Drill Heads.

**WRITE FOR FULL INFORMATION**

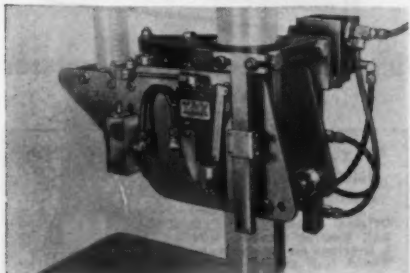


Also Makers of  
**DORMAN AUTOMATIC REVERSE TAPPERS**  
Circle No. 406 on Card, Opposite Page 65

283

## Air-hydraulic drill press feed adjusts rate of speed

The Fluid Feed air-hydraulic drill press feed features an oil-flow principle which adjusts rate of feed accurately from 2" to 60" per minute. Power is supplied by a double-acting air cylinder and regulated by a small hydraulic cylinder speed control valve. The air cylinder supplies pressure for the downward feed of the drill and returns it to the starting point after it reaches



a preset depth.

A system of hydraulic checks maintains a uniform speed, regardless of soft spots or break-through points, yet allows rapid approach to the work. A spiral oil duct which can be adjusted for speed is substituted for the usual needle valve. Mead Specialties Co., Dept. DP-6, 4114 N. Knox Ave., Chicago 41, Ill.

Use ACTION Card, opposite page 64, Circle No. 146

## Process for nitriding stainless steel parts

A process for the nitriding of stainless steel, called "Supercase," is available for use on parts where an extremely hard, wear-resistant surface with maximum corrosion resistance is needed.

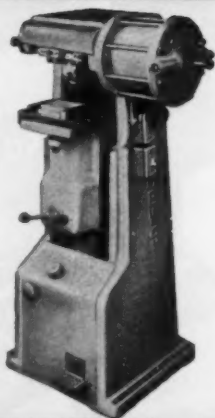
Because a uniform case, approaching the hardness of a diamond, is obtained by this process, only a very light case is required, usually between .0003 to

# MARKING MACHINES



General Purpose Hydraulic-Pneumatic Machines will mark round, flat and many contoured surfaces. Use either flat or roller dies. The 3 way No. 240 can be used as 12,000 lb. stamping press as well as single pass and reciprocator. Available in many models including manual operated.

High Production Rotary Machines easily mark at "thousands-per-hour" rates. Marks rounds that are solid or tubular and may be equipped with ejection features.



## JAS. H. MATTHEWS & CO.

3946 Forbes Street • Pittsburgh 13, Pa.

CLIFTON, N. J.

BOSTON

PHILADELPHIA

CHICAGO



## YESTERDAY...

Cars and taps gave low "mileage".



## TODAY...

the cutting characteristics and life of your taps are important factors in your costs of production.

BLAKE Flute and Chamfer Grinders can make substantial savings possible in your threaded-hole costs. They do this by creating or restoring:

1. Exact indexing of cutting edges.
2. Efficient rake angles for each job.
3. Correctly ground spiral points.
4. Perfectly relieved chamfers.

The accuracy and dependability of the Blake Flute Grinder and Blake Chamfer Grinder make it possible for you to do high-efficiency tapping . . . the only kind which pays off in profits today!

*Send for the details now.*

**EDWARD BLAKE COMPANY**  
INC.

MANUFACTURERS OF FLUTE AND CHAMFER GRINDERS

440 CHERRY ST., WEST NEWTON 65, MASS.

Exclusive Distributors of:

BLACK DIAMOND, PRECISION DRILL GRINDERS • SURFACE FINISH STANDARDS • WORCESTER DRILL GRINDER



## Shaft collars in 44 bore sizes

A line of shaft collars available in 44 bore sizes from 3/16" to 3" in 1/16" increments has been announced by Climax Metal Products Co., Dept. RH,



.0007. Supercase may be removed in the event of a change after the parts have been finished—the parts re-worked and then re-nitrided. If it is desired to machine an area further after nitriding, this area can be masked off and will remain soft after processing. Can be used on Martensitic, Ferritic, as well as Austenitic stainless steel. Standard Steel Treating Co., Dept. JS, 3467 Lovett Ave., Detroit 10, Mich.

Use ACTION Card, opposite page 64, Circle No. 147

**KELLER**  
*Die Filers*

★  
SAVE  
TIME  
★  
SAVE MONEY  
★  
PAYS for ITSELF



### FILING... SAWING... LAPPING...

Keller Die Filers pay for themselves over and over by reducing labor time and cutting down on scrap. Rugged, accurate they operate at 350 or 450 strokes per minute. Platform tilts for precise cutting of compound angles. Self-compensating chuck handles tools from 1/8" diam. to 1/2" x 5/8" and permits vertical adjustment to use entire tool cutting surface. Save time and money with a Keller Die Filer. Write today for Catalog 256.

### SALES SERVICE MACHINE TOOL CO.

2357 University Ave., St. Paul 4, Minn.

Circle No. 409 on Card, Opposite Page 65

285

## ENCO TURRETS Cut Lathe Costs!

- ✓ Accurate within .0005.
- ✓ Indexing is self-contained—eliminates all chip-interference.
- ✓ 12-position indexing.
- ✓ Hardened steel construction.

Send for Latest Catalog.



**ENCO** Manufacturing Co., Dept. 266  
4524 W. Fullerton Ave., Chicago 39, Ill.

Circle No. 410 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

863 E. 140th St., Cleveland, O. The new collars, equipped with precision, cup-point socket set-screws, are designed

to hold shafts mounted on plain bearings in position, eliminating floating. Available in sizes up to 2".

Use ACTION Card, opposite page 64, Circle No. 148

## Wire Baskets

Particularly adapted for handling fragile or highly finished parts, Nes-Tier wire baskets are offered in sizes ranging from 18" x 10" x 3" to 24" x 14" x 12". They are regularly furnished in bright basic steel wire, but are also available in other materials, including

stainless steel. Wire sizes range from No. 16 to 1/2".

Either nesting or stacking designs are available, with fixed or movable handles. The Chas. Wm. Doepke Mfg. Co., Inc., 8868 Blue Ash Rd., Rossmoynne, O.

Use ACTION Card, opposite page 64, Circle No. 149



**Drill More Holes Per Hour**  
In ANY Pattern...  
On ANY Drill Press

with a *Adjustable*  
**MULTI-DRILL**

Increase production up to 800%...save time, cut costs. MULTI-DRILLS make any drill press produce more. Attached without alterations or special tools. Quick, easy setups of universally adjustable spindles give you more flexibility...wider application. Handles any hole pattern within 9" circle; centers close as 1/2". Extension Spindles available to increase working area to 22 1/2". Special adaptations available.

**DRILLS ANY  
HOLE PATTERN**



**COMMANDER MFG. CO.**

4227 W. Kinzie St.

Chicago 24, Illinois



**Drills 2  
to 8 holes  
at one  
stroke**

*model*  
**900**

See your Commander Distributor for complete details. Write for the NEW Commander Full Line Catalog.

Product of *Commander*... Builder of Production Tools

Circle No. 411 on Card, Opposite Page 65

## Both sides of gear chamfered simultaneously

A new single station Burr-Master deburring and chamfering machine chamfers both sides of a gear simultaneously. This Model BME-14 duplex removes the sharp edges on the ends of gear teeth and simultaneously gets rid of the burrs resulting from the gear cutting process.

Spur gears, helicals and straight sided as well as involute form splines from  $\frac{5}{8}$ " to  $6\frac{1}{2}$ " pitch diameter can be handled at a production rate up to 5 teeth per second per side. At the end of the automatic chamfering cycle, the electric clutch stops rotation of the workpiece with the cutters in the "out" position for easy loading and unloading. Modern Industrial Engineering Co., Dept. JS, 14230 Birwood Ave., Detroit 38, Mich.

Use ACTION Card, opposite page 64. Circle No. 150



## Eliminate Costly Daily Machine Tool Setups with Hi-Lo Rapid-Adjustable MACHINE TOOL CLAMPS

*Any Clamping situation handled easily and quickly.*

### Exclusive Features

- Rapid, rigid clamping.
- Self contained — no loose parts.
- Adjustments made rapidly with special design lock screws. 1/4 turn only.



- Swivel base assures rigidity without marring.



- Lower part of Stud and Tee Bolt Assemblies interchangeable.

Send for descriptive folder

**HI-LO TOOL PRODUCTS CO., INC.**

18525 Weaver

Detroit 28, Mich.

Circle No. 412 on Card, Opposite Page 65

## NEW BRITAIN

## SWIVEL VISE



Jaws —  $1\frac{1}{2}$ " x  $5\frac{1}{4}$ "  
Maximum Opening 4"  
Weight 37 Lbs.

Write for further  
Information.

The body is made of semi-steel; the jaws of tool steel hardened and ground. All working surfaces are ground. The vise is as accurate as is possible and the degrees are cut to very close limits.

**NEW BRITAIN TOOL & MFG. CO.**

13 HARVARD STREET  
NEW BRITAIN, CONN., U.S.A.

Circle No. 413 on Card, Opposite Page 63

## CLIPPER

### PRECISION DIAMOND TOOLS

Industrial Diamonds

Thread Grinders

Turning Tools

Engraving Tools

Dressing Tools

Diamond Powder



Manufacturers of  
**DIAMOND  
WHEELS**

and Hones of  
highest quality.  
Prompt deliveries.

Ask for literature

Representatives in Principal Cities

**CLIPPER** DIAMOND TOOL CO., INC.

345D HUDSON ST. NEW YORK 14, N.Y.

Circle No. 414 on Card, Opposite Page 63

## ALL TYPES OF REAMERS

... THE RIGHT  
ONE FOR  
YOUR  
JOB

Piloted

Special Lengths

Special Diameters

Combination Cutting

**Schmarje**

**CARBIDE REAMERS**

STRAIGHT OR TAPER SHANK

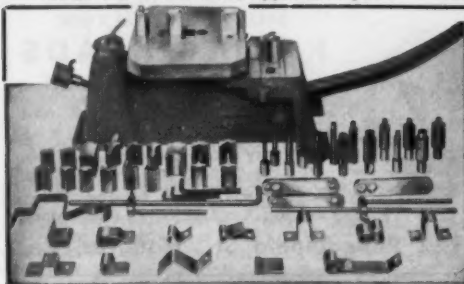
Send drawings for Prompt Quotations

**SCHMARJE TOOL COMPANY**

Carbide Reamers • Form Tools

MUSCATINE 1, IOWA

Circle No. 485 on Card, Opposite Page 63



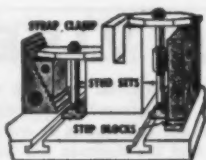
**Multiform** BENDER  
CUTTER

**CUTS, BENDS, PUNCHES**

Available in hand or air operated models, the MULTIFORM is shipped complete with full assortment of dies and mandrels to punch, bend and cut round or flat brass, bronze, aluminum, steel, etc., up to  $6\frac{1}{2}$ " as illustrated, other models up to  $1\frac{1}{2}$ ".

**J. A. RICHARDS CO.**  
KALAMAZOO, MICH.

Circle No. 486 on Card, Opposite Page 63



## SURE GRIP STEP BLOCKS

Clamping tools of all types

Write for free tracing templates

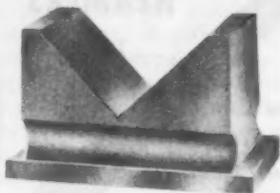
**TIETZMANN TOOL CORP.**

Dept. C. T.

Englewood, Ohio

Circle No. 415 on Card, Opposite Page 65

## SEMI-PRECISION "V" BLOCKS FOR ALL-AROUND SHOP USE



STOCK NO.	BASE	CAPACITY	NET PRICE EA.
10	4½" x 3"	2¾" dia	\$ 8.00
11	6½" x 4"	4¾" dia.	16.25

Sturdily designed for hard usage . . .  
Accurately machined close-grain iron . . .  
Ideal for drill presses, milling machines,  
shapers and planers. Will test round  
shafting for straightness . . . Economically  
priced.

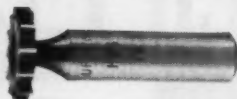
Write for descriptive bulletin

**ACME TOOL COMPANY**

71 West Broadway New York 7, N. Y.

Circle No. 416 on Card, Opposite Page 65

## WOODRUFF Keyseat Cutters



MADE FROM THE BEST WEAR RESISTANT  
HIGH SPEED STEEL FOR LONGER TOOL  
LIFE AND MORE CUTS PER GRIND.

ALL STANDARD SIZES IN STOCK AND  
ORDERS SHIPPED SAME DAY RECEIVED.

DISCOUNTS FOR QUANTITY USERS.

FASTEST SERVICE IN THE NATION ON  
SPECIALS.

LONG EXPERIENCE IN THE EXCLUSIVE  
MANUFACTURE OF KEYSEAT CUTTERS

FOR QUOTATIONS AND PRICES WRITE



**SUPREME KEYSEAT  
CUTTERS CO.**

1328 Forty-Third Street  
Kenosha, Wisconsin  
OL 4-8800

Circle No. 417 on Card, Opposite Page 65



## MUMMERT-DIXON FACING HEADS with Automatic Feed

One-way Tool Feed—6, 9 and  
12" sizes.

Two-way Tool Feed—9, 12, 16,  
20, 24, 30, 36, 40 and 46" sizes.  
Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

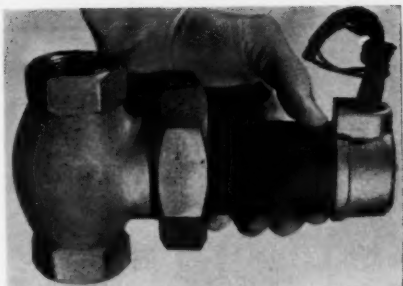
**MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.**

Circle No. 418 on Card, Opposite Page 65

## Stainless steel solenoid valve

A 1" stainless steel two-way globe type, pilot operated solenoid valve with packless construction operates at pressures ranging from 10 to 3000 psi, and is available in any voltage. The standard model is normally closed; but with modification, it can be made normally open through 300 psi; with the use of a relay, to 3000 psi. With a relay, power must be supplied at all times, since the valve will not open on power failure.

Type SS has a standard coil, for operation to 300 psi. Type HPSS has a high pull coil, for applications to 1500 psi. Over 1500 psi, and to 3000 psi, a double wound coil and relay are required. The function of the relay is to energize a primary winding, giving a strong impulse to positively open the pilot valve. The secondary winding is



then cut in, holding the valve open at low current consumption. Manufactured by Atkomatic Valve Co., Inc., Dept. HS, 545 W. Abbott St., Indianapolis, Ind.

Use ACTION Card, opposite page 64, Circle No. 153

## Height gage, comparator, and scriber has heavy base

The improved Dickerman height gage, comparator and scriber is now available with a rugged, heavy base for addi-



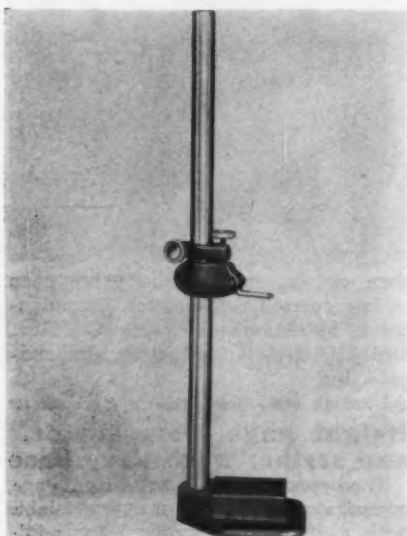
## Engineered Live Centers

... A properly designed Live Center is one of the fundamentals of setting up a job and requires a specialist's experience. Characteristic of the design of all STURDIMATIC LIVE CENTERS is a low overhang and a slight cushioning action that compensates for expansion due to heat shock and excessive thrust loads—reducing wear to a minimum. Send us your blueprints and specifications—we will see that your job is set up with the right Live Center. Standard shanks with Morse taper carried in stock.

**STURDIMATIC  
TOOL COMPANY**

390 F STREET • DETROIT 16, MICH

Circle No. 419 on Card, Opposite Page 65



tional stability and accuracy. 0-0 indicator readings are speedily obtained by

setting the instrument with gage blocks. Settings in the tenths of thousands are quickly attained as one revolution of the adjusting screw moves the sliding member less than .006".

Height gage is available in four column lengths—10", 14", 18", and 24". Dickerman Mfg. Co., Dept. JP, 321 Albany St., Springfield, Mass.

Use ACTION Card, opposite page 64, Circle No. 154

### Portable drill press has electro-magnetic base

The heavy duty electro-magnetic base of this drill press makes it possible to affix the power drill right to the surface of a job. Regardless of working position, the burden of drill weight is completely spared the operator.

A 3-way power control switch enables operator to vary the holding power in the base. The switch allows for a reduction in power sufficient to hold weight of unit against working surface yet allowing for movement for

A good machinist  
looks first to the  
COLLET!...and  
first in COLLETS is

## RIVETT!

Stocked in all standard styles for immediate delivery. Fractional round sizes and decimal equivalents from 1/64" to capacity; square, hexagon and taper holes. Transparent packaging for easy identification.

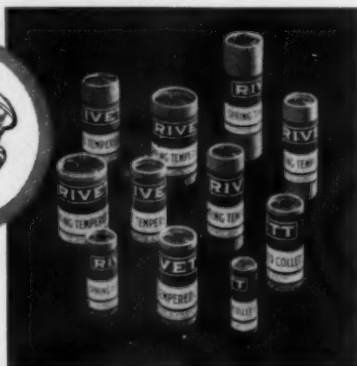


Write for Bulletin 100E

RIVETT LATHE & GRINDER, INC.

Dept. MTC6, Brighton 35, Boston, Massachusetts

Circle No. 420 on Card, Opposite Page 65



Collets for all lathes including American, Atlas, Axelson, Cincinnati, Hardinge, LeBlond, Lodge & Shipley, Logan, Rivett, Rockford, Sheldon, South Bend.

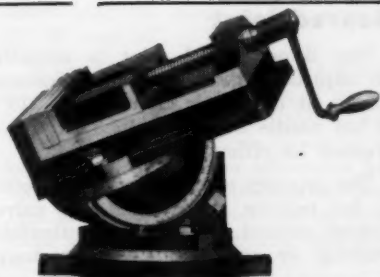
## SET UP COMPOUND ANGLES INSTANTLY!

Now save valuable time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for circular.

**DONOVAN MFG. CO.**

80 Batterymarch St. Boston 10, Mass.



Circle No. 421 on Card, Opposite Page 65

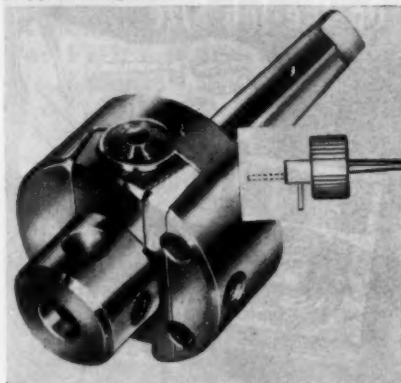


positioning to center punch mark. Full power position will hold the unit securely for accurate drilling work. Portomag, Inc., Dept. JS, 1511 E. Nine Mile Rd., Ferndale 20, Mich.

Use ACTION Card, opposite page 64, Circle No. 155

### Boring head

The Flynn 43-B offset boring head offers a  $\frac{5}{8}$ " bar capacity, both perpen-



dicular and parallel holding of tools. Body and tool block extension are round.

The head has built-in micrometer adjusting tool block offset to  $\frac{5}{8}$ " in increments of .001" with .050" to a turn for speed of setting. Flynn Mfg. Co., Dept. JS, 133 Flowerdale, Ferndale 20, Mich.

Use ACTION Card, opposite page 64, Circle No. 156



**DYKEM  
STEEL BLUE**

**Stops Losses**

making Dies and  
Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

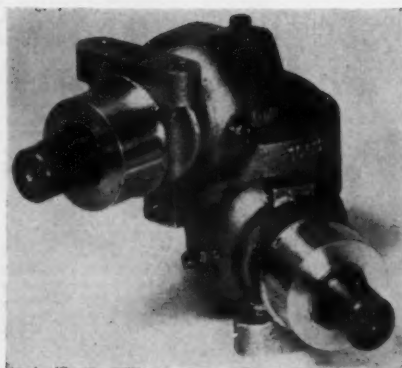
Write for sample on company letterhead  
**THE DYKEM COMPANY**  
2301G North 11th St. • St. Louis 6, Mo.

Circle No. 422 on Card, Opposite Page 65

## Geared joint

The Stow geared joint is actually an adjustable gear box that transmits torque at any angle from 45° to 315°. It has needle bearings which have increased its efficiency.

The primary use for the geared joint is for making sharp bends in valve remote control linkages using flexible shafting or reach rods. These sharp



bends are often necessary in order to avoid obstacles. The worker installing the unit merely connects up each end to either flexible shafts or reach rods, brackets the joint in place at one end, and then drills a spot for a set screw to keep the two halves of the joint at the proper angle. With the needle bearings, the geared joint can now be used for power applications with speeds up

**On-the-Job Size...**

**and Packed with useful DATA...**

This 96-page ABART handbook on **SPEED REDUCERS • CUSTOM-CUT GEARS** is yours without obligation. Write for your free copy today.

**ABART GEAR and MACHINE CO.**

4829 WEST 16th STREET • CHICAGO 30, ILLINOIS

Circle No. 423 on Card, Opposite Page 65

## Make your own Storage & Pallet Racks



with Amidon Fittings and one inch pipe.

**Amidon Engineering Co.**  
ELYRIA 10, OHIO

Circle No. 424 on Card, Opposite Page 65

OPEN

CLOSED

TRADE

**AUTOM**

MARK

CLOSED

OPEN

**Plain Type**

**CONTINUOUS HINGES**

**Offset Type**

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

**THREE-FOURTHS OFFSET**

**AUTO MOULDING & MFG. CO.**  
**1110 E. 87TH ST.**  
**CHICAGO 19, ILL.**

**SPECIFICATIONS**  
Open width 7/8" to 6"  
Gage Material .040 to .125  
Pin Diameter .101 to 3/8"  
Lengths to 120"

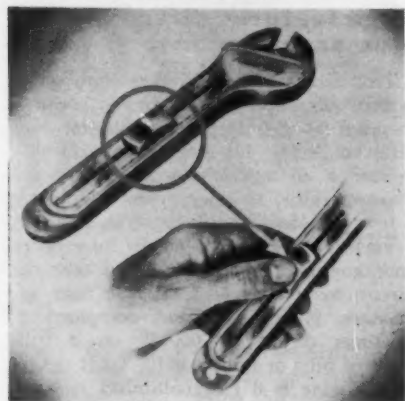
**SEMI-OFFSET**

Circle No. 425 on Card, Opposite Page 65

to 500 rpm. They are available in three sizes. Stow Manufacturing Co., Dept. RS, 30 Shear St., Binghamton, N.Y.

Use ACTION Card, opposite page 64, Circle No. 157

### Automatic wrench



An automatically adjusted wrench, the Auto-Grip, has a forged aluminum handle and steel lower jaws with an

insert steel lip. Made in four sizes, 6", 8", 10" and 12".

In the 8" model, pictured, the wrench can be adjusted up to 15/16s of an inch by light pressure on the adjustable button on the handle. Once pressure has been released from the adjustable button, the wrench locks in position. Bearings of the wrench are made of nylon. BMS Enterprises, Dept. RB, 5512 Dyer St., Dallas, Texas.

Use ACTION Card, opposite page 64, Circle No. 158

### Automatic clutch for FHP motors

Mercury 305 automatic clutch, designed for 1/6, 1/4 and 1/3 hp electric motors, is recommended for original equipment on air conditioners, furnace blowers, automatic washers, sweepers, dryers, power tools, vacuum pumps and other FHP powered equipment.

The clutch reduces the length of sustained inrush current by permitting the



### WHEELS AND GUIDES

Carter band saw accessories used as standard equipment by leading band saw manufacturers.



- Rigid Band Saw Wheels
- Demountable Tires
- Micro-Guides
- Guide-Line Lights



**CARTER PRODUCTS CO. INC.**

431 Wm. Alden Smith Bldg., 30 Janis Avenue, S. W.  
GRAND RAPIDS 2 MICHIGAN

Circle No. 426 on Card, Opposite Page 65

June, 1956

### COOPER WEYMOUTH VARIABLE SPEED STOCK STRAIGHTENERS

Portable cabinet units in sizes 6" up to 24". Constant or variable speed drives with forward, reverse and cut-out switch. Five, seven or nine straightening rolls. Pinch rolls and all bottom straightening rolls power driven.



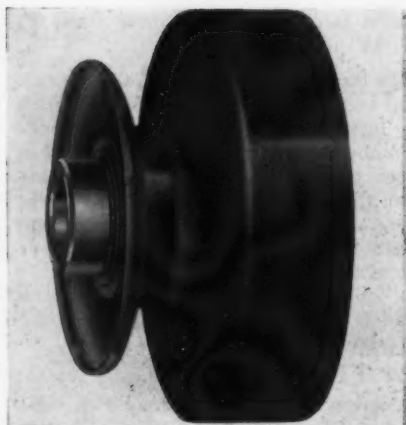
**WRITE FOR  
DETAILS**

**COOPER  
WEYMOUTH  
INC.**

277 NOBLE AVE., BRIDGEPORT 8, CONN.

Circle No. 427 on Card, Opposite Page 65

295



motor to reach full speed before any load is applied. Effective in handling high inertia loads, it claims smooth acceleration and the transmission of full power without slippage.

This standard model has a 5/8" bore and a pulley size of 2½" x 1A. Mercury Clutch Div., Automatic Steel Products, Inc., Dept. RH, Canton, O.

Use ACTION Card, opposite page 64, Circle No. 159

### Gage features direct setting plus accuracy

This direct setting Electro-limit gage is fast, adaptable and accurate; recommended for gaging parts of similar but different sizes, for gaging several dimensions on a single part, for use as a comparator on short runs involving a few to a few hundred parts, and for a variety of other precision inspection and gaging jobs. Capable of setting direct to .0001" without the use of masters, gage also gives comparative readings direct to .00005" on a full scale of plus or minus .001". Total range of the gage is 6"; repeatability is with .00005".

Standard gage blocks are used to set



do you have a  
**TOOL PROBLEM**

Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!

**COLUMBUS DIE-TOOL**  
*and Machine Co.*  
P. O. BOX 750 • COLUMBUS, OHIO

Circle No. 428 on Card, Opposite Page 65  
296



### DON'T LET THIS HAPPEN

End Oily Floors with

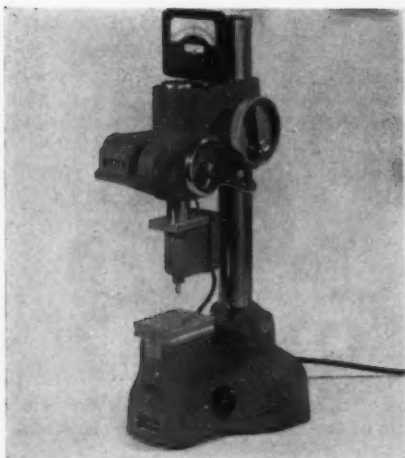
**DRY-IT**

Reduce Accidents and Costly Time-Offs  
No Fire Hazard!

Write For Free Sample!

**TAMMS INDUSTRIES, INC.**  
228 N. LaSalle St. Chicago 1, Ill.

Circle No. 429 on Card, Opposite Page 65  
MACHINE and TOOL BLUE BOOK

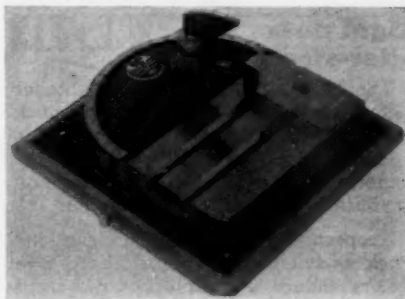


the gage for even inches. Fractional inch settings are obtained by operating a handwheel that elevates the gage head through a precision micrometer screw. The desired setting is read direct to

.0001" on the setting counter. Re-setting within the established inch range is accomplished by turning the handwheel as required. The Pratt & Whitney Co., Inc., Dept. MG, West Hartford, Conn. Use ACTION Card, opposite page 64, Circle No. 160

### Quick-Check angle finder

Only four moving parts are contained in the Precision Quick-Check angle finder, a protractor for checking single



## HYDRAULIC PRESSES



1½ to 75 ton

Capacity

Send for

Catalog

Showing

Complete

Line

**GREENERD ARBOR PRESS CO.**

141 CROWN ST.

NASHUA, N.H.

Circle No. 430 on Card, Opposite Page 65

June, 1956

## PORTABLE ELEVATING TABLE



**Saves  
TIME  
and  
LABOR**

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height from 31" to 46½", leaving operator's hands free. Table swivels and locks in any position.

Our major services — Designing and Building — Dies, Jigs, Fixtures and Special Machinery.

SEND TODAY FOR ILLUSTRATED CATALOG No. 2

**THE MIDWEST TOOL & ENG. CO.**  
112 WEBSTER ST., DAYTON, OHIO

Circle No. 431 on Card, Opposite Page 65

297

point tools, both carbide and high speed. Besides cutting edges, instrument checks the top rake and side clearance angles as well. It is self-aligning. No setting between tools or different size tools.

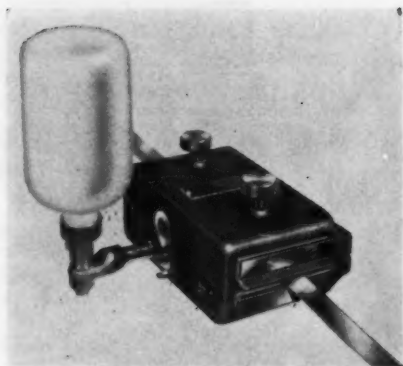
Capacity: cutting angles on tools up to 2-1/4" high, rake and clearance angles on tools up to 1-3/4" high. Distributor is KP National Sales, Dept. JS, 1036 Terrace St., Muskegon, Mich.

Use ACTION Card, opposite page 54, Circle No. 161

## Light duty oiler-straightener

The Jaco light duty oiler-straightener cleans, straightens and lubricates stock up to 3" wide in one operation. It is designed to remove "coil-set" for smooth feeding, but will not straighten or flatten badly kinked material.

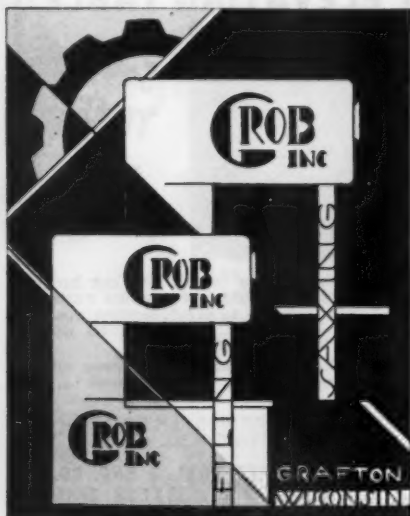
Neoprene rubber wipers clean the stock as it enters the case. There, five rollers induce a double reverse bend as the material is pulled through. Three



lower rollers pick up oil from the bottom of the case and apply it to the stock.

The storage reservoir of oil is a polyethylene bottle with a one pint capacity. Excess oil is removed by felt pads, leaving an even film on both surfaces of the stock. Jaco Devices, Inc., Dept. JP, 99 High St., Hingham, Mass.

Use ACTION Card, opposite page 54, Circle No. 162



GROB INC., GRAFTON, WISC.  
Circle No. 432 on Card, Opposite Page 65

298

## Extra Capacity with hall COLLET CHUCKS

for  
SPEED,  
ACCURACY,  
ECONOMY



Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over.

Tremendous grip over or under stock size.

Without adjustments. Shortest overhang. All grip ...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.

**SATISFACTION GUARANTEED!**

Made in Three Sizes to Fit Your Requirements:

Model A...1" (max. capacity 1-1/16")

Model B...2" (max. capacity 2-1/16")

Model C...3" (max. capacity 3 3/4")

Write today for illustrated catalog and price list—Dept. A-6

**HALL MANUFACTURING COMPANY**

422 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

Circle No. 433 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

## Disposable wipers

Disposable industrial paper wipers manufactured by Scott Paper Co., Dept. RS, Chester, Pa., are now available in two different sizes. The original large size wiper, No. 59, consists of two-ply sheets that measure nine and five-



eighths by thirteen and five-eighths inches. For industrial wiping jobs that can be done with a smaller size paper wiper, however, one has been introduced consisting of two-ply sheets that measure nine and five-eighths by ten and one-quarter inches. Boxes contain 125 wipers, with 18 boxes to a case.

Use ACTION Card, opposite page 64. Circle No. 163

## Automatic drill unit

The Model DU-2 automatic drill unit has a drill capacity ranging from wire sizes to  $\frac{1}{2}$ " in steel.

A sensitive electric relay system controls the cycle and the drill depth. A hydraulic system controls the rate of spindle feed and prevents overtravel at the bottom of the spindle stroke. Drill depth can be set to less than .005" within the 3" maximum stroke. Rate of feed can be set from zero to the maximum the drill will stand. Air pressure, set to the drilling requirements, is used to feed the spindle forward and to return

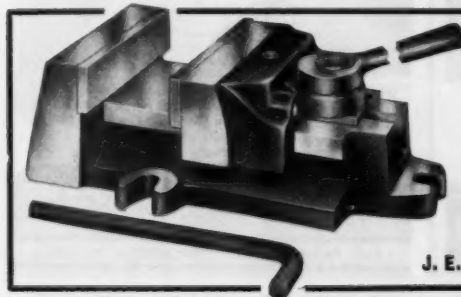
## FLYNN BORING HEADS



**LEADING NAME IN  
BORING HEADS FOR 40 YEARS  
19 MODELS Write for catalog**

**FLYNN MANUFACTURING CO.**  
133 FLOWERDALE AVE. • DETROIT 29, MICH.

Circle No. 434 on Card, Opposite Page 65



**Plunket Quick Action Vise**  
for DRILL PRESS or MILLING MACHINE  
Designed for production work, using an eccentric motion to apply pressure to jaws. Eccentric motion moves jaws  $\frac{1}{4}$ ".

Size No. 7 Net Price  
6" Jaws,  $1\frac{1}{2}$ " deep, opens 4" ....\$91.48  
Pressure between jaws, with handle furnished, 2200 lbs. Net weight 36 lbs.

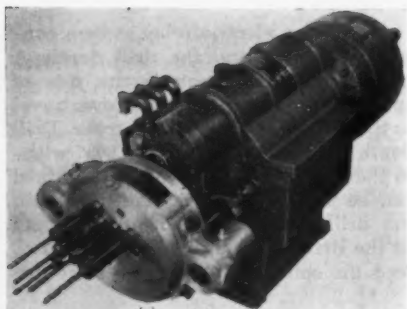
Our complete line includes Vises for Drill Presses, Milling Machines, Shapers, Grinders

**WRITE FOR CATALOG**

**J. E. Plunket Machine Co.**

3230-32 Arreher Ave.  
Chicago 8, Ill.

Circle No. 435 on Card, Opposite Page 65



it to its starting position.

The spindle drive is supplied by either a direct mounted motor or by a standard pulley shaft assembly. Since the spindle feed and return is air-actuated through two hardened and ground power rods, the spindle assembly and the drive unit are not subject to forward, end or side thrusts. Ettco Tool Co., Inc., Dept. RS, 594 Johnson Ave., Brooklyn 37, N.Y.

Use ACTION Card, opposite page 64, Circle No. 164

## WALLS TU-WAY BELT SANDER

**USE IT  
EITHER WAY**



Full  
1/3 h.p.  
G. E. Motor

**VERTICAL**



**HORIZONTAL**

At last, a top quality industrial sander that provides all the most wanted features - yet sells for so little. **\$89.95**

complete with cord, plug, switch ready to use

Illustrated Literature on Request

A few desirable distributor territories still available.

**WALLS SALES CORPORATION**  
333 Nassau Avenue      Brooklyn 22, N. Y.

Circle No. 436 on Card, Opposite Page 65

300

## Jig saw makes bevel cuts on either side

A heavy-duty jig saw that can perform bevel cuts on either side up to 45° has been announced by the Black & Decker Mfg. Co., Dept. RS, Towson 4, Maryland.

A full one-inch stroke can cut from a depth of 2 inches at 90° to 1 3/4 inches at 45°. The shoe can be adjusted to any angle by means of a clearly calibrated quadrant. A special universal motor has power to make straight, curved, sharp radius and irregular cuts through a 2 x 4, or with the proper blade through plywood, metal sheets, rods, tubes, plastics, fibre glass, masonite, and leather.

Vibration is eliminated by a dynamically balanced reciprocating action that minimizes operator fatigue during long periods of continuous operation. The line of cut is blown free of chips by a forced air flow that cools the motor and then is directed through the tool

### 20 TO 200 D.P.

SEND YOUR PRINTS FOR QUOTATION



SPURS • HELICALS • WORM AND WORM GEARS
STRAIGHT BEVELS • LEAD SCREWS • RATCHETS
CLUSTER GEARS • RACKS • INTERNALS • ODD SHAPES

THE *Finest* IN GEARS

*Beaver Gear Works Inc.*

1033 PARMELE ST.    ROCKFORD, ILLINOIS

Circle No. 437 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK



housing to the cutting edge.

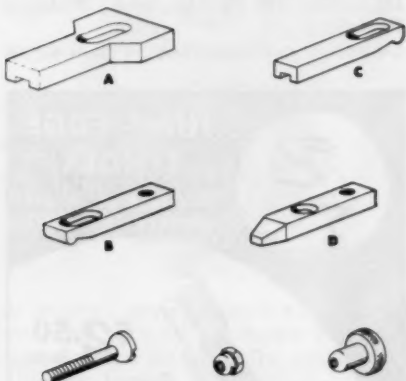
Weight of the new heavy-duty jig saw is six lb. Included with the tool are a metal-cutting blade and three

high speed taper ground wood-cutting blades—fine tooth, coarse tooth (narrow) and coarse tooth (wide) respectively.

Use ACTION Card, opposite page 64. Circle No. 165

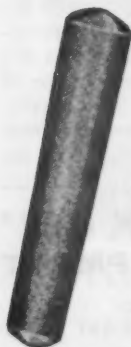
## Stainless steel clamps

Stainless steel clamps for precision



**SPECIFY**

**STANDARD**



## TAPER PINS

ALSO FOR

- MACHINE RACKS
- WOODRUFF KEYS
- MACHINE KEYS

STANDARD TAPER PINS are milled from carefully selected bar stock to extremely close tolerances . . . straight to taper. The uniformity and accuracy of STANDARD TAPER PINS will save time on assembly . . . will assure you of trouble-free service. Available in STANDARD steel . . . also in stainless steel and brass. Specify STANDARD TAPER PINS and other STANDARD products.

SEND TODAY FOR CATALOG

**STANDARD STEEL SPECIALTY CO.**

BEAVER FALLS • PENNSYLVANIA

Plants: Beaver Falls, Pa.; Hammond, Ind.

Circle No. 439 on Card, Opposite Page 65  
June, 1956

## WATERTIGHT!



**OVER  
5,100,000  
CONTACTS  
UNDER  
WATER!**

(Switch Reversing  
Actuating Motor)

**LOX SWITCH** Heavy Duty  
**LIMIT SWITCHES**

**FREE** 4 page folder describing 7 models,  
19 contact arrangements.

**R. B. DENISON MFG. CO.**

102 St. Clair Ave. N.W. • Cleveland 13, Ohio

Circle No. 438 on Card, Opposite Page 65

tooling are of the swivel type, designed for better contact with cast surfaces.

Types: (A) sliding, wire face; (B) round nose, rear tightening; (C) sliding, round nose; (D) rear tightening, taper nose. The swivel stud, hex swivel nut, and knurled swivel nut shown are all interchangeable with the corresponding clamps. Von Industries, Inc., Dept. MG, 192 Hillside Ave., Williston Park, N.Y.

Use ACTION Card, opposite page 64. Circle No. 166



## JUMP EDGE FINDER

Locates edge in one  
minute within .0005



## \$2.50

Each

*Prepaid orders*

Locates edge or step  
instantly and un-  
mistakably every  
time within .0005.  
Complete satisfac-  
tion or money back.  
COD order plus pos-  
tage.

*Dealer Inquiries Invited*

**ELISHA PENNIMAN**  
460 South Main St.  
WEST HARTFORD 10, CONN.

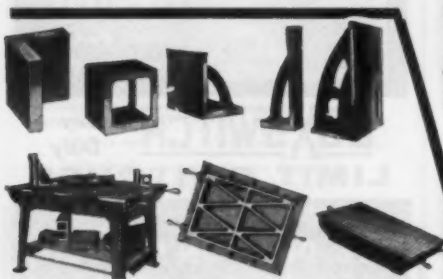
Circle No. 440 on Card, Opposite Page 65

## Metallizer has simplified air governor control

The dynamically balanced air turbine of the Vanco metallizing machine provides positive power control **uniformly** feeding metal wire without fluctuation.



The turbine is automatically governed by the propulsion fluid supplied to the primary and secondary turbine, so arranged that their opposing forces are in direct proportion to the change of volume or pressure of the fluid supply, encased in a one-piece gear case that assures positive bearing alignment for



## "MILWAUKEE" Precision EQUIPMENT

**SURFACE PLATES—ANGLES—  
PARALLELS—STRAIGHT EDGES**

Made from highest grade semi-steel—designed and finished for true dimensional accuracy.

Write for Latest Catalog

**J. C. BUSCH COMPANY**

Engineers & Machinists Since 1907  
165 S. Barclay St., Milwaukee 4, Wis.

Circle No. 441 on Card, Opposite Page 65

the high speed turbine and component parts.

Self-contained gas mixing chamber nozzle eliminates danger of backfire. Vandersee Corp., Route 22, Union, N.J.

Use ACTION Card, opposite page 64, Circle No. 167

### Gears deburred and chamfered at high volume rates

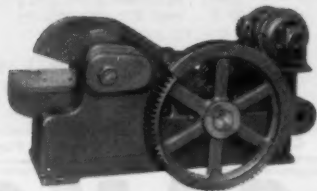
Automation is available on BME-24 two-station external gear deburring and chamfering machines and BMI-15 single station internal machines. On both, production rate of deburring and chamfering 5 teeth per second is maintained. It is possible to change from one gear to another within a reasonable range by making relatively minor changes in machine tooling and automation fixture tooling while keeping the basic automation intact.

Deburring and chamfering both sides



of external gears requires no operator attention with an automated two-station, external machine. The actual pro-

# Beloit



### ALLIGATOR SHEARS

These are high speed shears designed for heavy duty. Frames, levers and eccentric shafts are solid steel castings. Can be furnished with gear keyed to eccentric shaft for continuous operation, or mounted on legs with foot operated clutch shifter. WRITE FOR COMPLETE DETAILS.

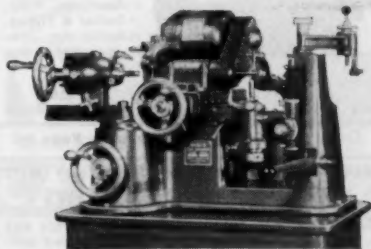
*Buy  
Beloit*

**HENDLEY & WHITEMORE CO.**  
100 BLACKHAWK BLVD. • BELOIT, WIS.

Circle No. 442 on Card, Opposite Page 65  
June, 1956

## HYBCO TAP GRINDER

Sharpens Chamfers, Flutes  
and Spiral Points



Model 1100

- Capacities No. 0 Machine Screw to 1 1/2" Hand Taps

**HENRY P. BOGGIS & CO.**  
710 E. 163rd St. Cleveland 10, Ohio

Circle No. 443 on Card, Opposite Page 65  
303

## READING BENCH KEYSEATER

Portable — move directly to job; a time saver for both small and large shops.

3 3/4" stroke; adaptable for other work.

Low first cost, prompt delivery. Good dealers wanted.

**Reading Machine Co.**  
Cincinnati 37, Ohio



Circle No. 444 on Card, Opposite Page 65



## DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature

**WATTS BROS. TOOL WORKS**  
Wilmerding, Pa.

Circle No. 445 on Card, Opposite Page 65

## "KNOWN AS THE BEST" GEM VISES

Their "Versatility" and "Quick-Action", without use of cumbersome wrenches, will soon repay their cost in time-savings, safety and convenience.



Complete range of sizes for all Machines. Plain, Swivel & Tilting. Write for complete information.

**J. E. MARTIN MACHINE CO.**  
848 W. STATE SPRINGFIELD, OHIO

Circle No. 446 on Card, Opposite Page 65

## Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from 3/16" to 3/4" U.S.S. Inexpensive — Last for years.



Write for Circular  
**NIELSEN TOOL & DIE COMPANY**  
17360 Lahser Rd.  
Detroit, Michigan

Circle No. 447 on Card, Opposite Page 65

## SAVE 90% CHECKING TIME

### When Building Dies

This new method of checking tapers on dies does away with die squares and height gauges.

Write for complete details.

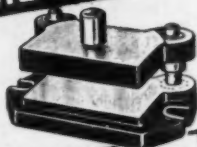
**Tietzmann Tool Corp.**  
D.C. 1 Englewood, Ohio



Circle No. 448 on Card, Opposite Page 65

## DANNEMAN *Precision* DIE-SETS

Precision-Bored  
on Master Plates



**DANNEMAN DIE-SET DIVISION**  
ACME-DANNEMAN COMPANY, Inc.  
201 Lafayette St. New York 12, N. Y.

CATALOG  
ON REQUEST

Circle No. 449 on Card, Opposite Page 65

## MINIATURE DRILL BUSHINGS

Hole Sizes—No. 80 to 3/32"

O.D. 3/32" to 13/64"

Lengths 1/4" to 3/4"

.0002 Tolerance on I.D.,  
O.D., and Concentricity

WRITE FOR CATALOG

**PREBCO BUSHING CO.**

14702 East Arrow Highway  
Baldwin Park, California

Circle No. 450 on Card, Opposite Page 65

## CAMS

To Your Specifications  
except Screw Machine Cams

Design Assistance Offered

**KIDDE PRECISION TOOL CORP.**  
25 LOCUST AVE. ROSELAND, N.J.

Circle No. 451 on Card, Opposite Page 65

MACHINE and TOOL BLUE BOOK

duction rate depends on the number of gear teeth but a typical example is a 30-tooth gear that can be deburred and chamfered on both sides at a rate of 300 gears per hour. Automated Burr-Masters can be supplied for gears from  $\frac{5}{8}$ " to  $6\frac{1}{2}$ " p.d. Modern Industrial Engineering Co., Dept. JS, 14230 Birwood Ave., Detroit 38, Mich.

Use ACTION Card, opposite page 64, Circle No. 168

### Copying shaper speeds production of complex contours

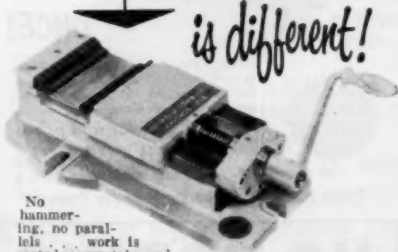
Such parts as splines, contoured



punches, externally contoured sections, metal removing electrodes or punches, short-run contoured pieces, are made quickly and accurately with an hydraulic shaper which is template controlled for machining external contours.

The template, made to the same contour as the part to be machined, is normally the same size as the work. It is possible, however, to make it larger than the work if desired. This is especi-

### the **IMP** "HOLD-DOWN" VISE *is different!*



No hammering, no paralleling... work is seated accurately and securely in 9 seconds or less with the IMP. Closer tolerances, easy to clean, one hand operation are additional reasons why you save production time, eliminate second grinding operations and cut costs with the IMP... perfect for surface grinding of non-ferrous parts, too!

Try the IMP in your shop for 30 days... if it isn't all we say it is, return it without obligation.

Write for FREE IMP "HOLD-DOWN" Brochure



**ILLINOIS METAL PRODUCTS**

433 W. Superior St. • Chicago 10, Ill.

Phone: Superior 7-3761-3762

Circle No. 453 on Card, Opposite Page 65



### HAND KNOBS

6 Sizes Cast-Iron

Tapped, Reamed or Blank

Hex-shaped hub for extra tightening

Write for catalog

**TIETZMANN TOOL CORPORATION**  
DEPT. H-K ENGLEWOOD, OHIO

Circle No. 454 on Card, Opposite Page 65

June, 1956

## CAM MILLING

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

*Your Inquiries Answered Promptly*

**HIMOFF MACHINE CO. INC.**  
23-22 45th Road Long Island City 1, N. Y.

Circle No. 452 on Card, Opposite Page 65

305

ally useful for machining parts with numerous curves in the profile.

Ram stroke is about 11-11/16" and maximum work length 11". Largest diameter piece that can be accommodated is 7-13/16". Strokes per minute run 30, 60, 90 and 180. Rotary work feed is adjustable from 1½° to 198° per minute. Haller, Inc., Dept. JS, Plymouth, Mich.

Use ACTION Card, opposite page 64. Circle No. 169



**Make 3  
hammers  
AT ONCE!**



It's the NEW, easy, economical, quick way to mold your own lead hammers on a production basis with "SHUR-GRIP" handles and this COOK production mold.

*Write for circular and prices*

**LAWRENCE H. COOK, INC.**

47 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

Circle No. 435 on Card, Opposite Page 65

## JIG BORING

and

**Large Precision Machining  
Done to your specifications  
WE HAVE 21 JIG BORERS**

**KIDDE PRECISION TOOL CORP.**

25 LOCUST AVE.

ROSELAND, N.J.

Circle No. 436 on Card, Opposite Page 65

## BREMIL

The IMPROVED Compound Lever Shears

**ALL ALLOY  
FULLY  
GUARANTEED**



Two Sizes

PORTABLE

No. 1 cuts up to No. 11 gauge strip or sheet.  
No. 2 cuts up to ¼" steel plate.

**BREMIL MFG. CO.**

1020 Holland Street, Erie, Penna

Circle No. 437 on Card, Opposite Page 65

## Compensating chuck

The Buck compensating chuck simplifies changing from one diameter to another. It will operate equally well with the machine running or stopped,



allowing automatic loading and unloading. The compensating mechanism increases the gripping power permitting rapid stock removal.

The center can easily be set dead true. Chuck can also be used as a standard power chuck when required. Buck Tool Co., Dept. JS, Kalamazoo, Mich.

Use ACTION Card, opposite page 64. Circle No. 170

## Deep-cut hole saws

A rugged set of follow-through-type deep-cut hole saws, complete with two mandrels in a compact steel box, has been introduced by Millers Falls Co., Dept. JP, Greenfield, Mass.

The saws (in sizes from 1-1/16" to 2-9/16" dia.) have a high-speed-steel cutting edge welded to a chrome-vanadium body. The cutting teeth, four to the inch, bite through most building materials.

Depth of cut is 2½ inches. As the saw follows through its own hole, deeper cuts can be made by removing the



## Automatic Bar Feeder

Designed for use with the Modern cutting-off machine, this new bar feeder

handles random lengths of tubing and bar stock automatically, feeding the en-



**The ONLY Live Center On Which  
Points May Be Interchanged to  $\pm .0001$**

Points Must Be  
Ordered With  
LIVE CENTER  
To Achieve This  
Degree Of  
Accuracy.



Ask your local distributor or  
write direct for 26-page Cata-  
log on Live Centers, Collets,  
Internal Collets, Draw Bars,  
and Turret Tool Posts.



## Empire Live Centers

Quality engineered for use on lathes, grinders,  
and milling machines . . . Empire Live Cen-  
ters are versatile, accurate, heavy duty.  
Tapered seats give consistent precision align-  
ment . . . assure accuracy of .0001. Positive  
seal eliminates dirt, grit, cutting oils. Com-  
bination bearings absorb both radial and  
thrust loads.

Manufactured in all tapers:  
Morse, Brown & Sharpe,  
Jarno, and straight shank.  
Special shanks and points  
to order.



Empire Toolmaker's Set  
available in handrubbed  
American Walnut case.

**ROYAL PRODUCTS, 84 Union Street, Mineola, L. I., N. Y. Pioneer 6-4245**

tire stock load to the machine without any attention from the operator. Remnants of each bar or tube are automatically ejected and the end of each new bar is automatically trimmed and chamfered.

The feeder has a hopper for use with lighter wall tubing. It holds about 100 pieces of 2 $\frac{3}{4}$ " o.d. or equal bulk of other sizes. An inclined table is used for bar stock or heavy tubing. Where both light wall tubing and heavy bars are used, the feeder may be equipped with both hopper and inclined table.

For small diameters and light wall tubing a V trough is used. For large stock there are rollers on which the stock rotates while cutting-off, and lifting rollers for the stock while being fed through the spindle. Modern Machine Tool Co., 2005 Losey Ave., Jackson, Mich.

Use ACTION Card, opposite page 64, Circle No. 173

## Helical cutter grinding simplified

A new type grinder for end mills and other small tools, called "Centra-Point" end mill grinder, features a simplified method for grinding helical cutters.

Clearance angles can be read directly from calibrations on the wheel head assembly, without reference to tables of constants. Mechanical wheel dressing by built-in diamond truing tools is claimed to insure a perfect wheel radius for helical grinding.

In sharpening tool steel or carbide cutters, the operator checks recommended machine settings in operating manual, attaches the proper tooth rest and the setup is complete.

Specifications: collet capacity, up to  $\frac{3}{4}$ " dia.; dia. of largest cutter accommodated, 3"; dia. of grinding wheels, 2"; work head swivel scale, 0° to 90°;



## FOR PRECISION GROOVING, RECESSING AND BACKFACING

Versatile MAXWELL recessing tools can be used on any drill press, boring mill, turret lathe, radial drill or milling machine. Ball-bearing pilots and high speed or carbide cutters are interchangeable to handle any job within range of holders.

MAXWELL recessing tools are precision built for sustained accuracy in production runs . . . yet take cuts at unusually high feeds. 4 sizes available for  $\frac{3}{8}$  to 4-inch holes.

Write today  
for literature.



1088-MC

# THE MAXWELL COMPANY

MACEDONIA, OHIO

Circle No. 461 on Card, Opposite Page 65



# Miccro Spray

## LAY-OUT DYE

(Purple)

MICCRO Lay-Out Dye, long the leader in its field, now available in an AEROSOL package for SPRAYING.

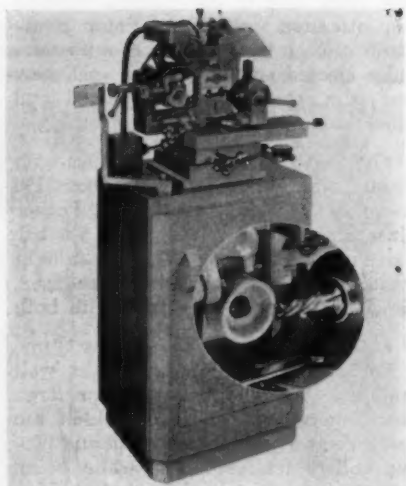
All the advantages—instant drying; clear, sharp lines—*plus* easy-to-use, dependable, efficient MICCRO Spray container.

Regular MICCRO Supreme Lay-Out and Identification Dye in seven distinctive colors available as always in brush-in-cap and conventional containers.

*Write for circular  
on company letterhead*

**MICHIGAN CHROME  
& CHEMICAL COMPANY**

8615 Grinnell Ave., Detroit 13, Mich.

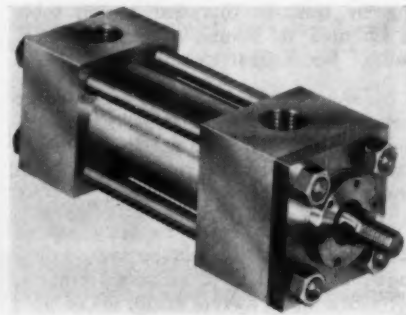


clearance angle scale, graduated, 15° up, 15° down; carriage travel, 4". William H. Field, Inc., Dept. JP, 325 Dorchester Ave., Boston 27, Mass.

Use ACTION Card, opposite page 64, Circle No. 174

### Hydraulic cylinder

A heavy duty hydraulic cylinder, rated at 2000 psi, has heavy walled seamless steel tubing micro-honed for minimum friction; rolled steel heads recessed to confine the tube, prevent breathing and provide additional protection against leakage under the most severe usage; piston rods hard chrome plated, turned, ground and polished from stress relieved high tensile steel;



Circle No. 462 on Card, Opposite Page 65

**SID TOOL**  
COMPANY, INC.

Your headquarters for Special  
Taps and Drills now stocks...

HIGH  
SPEED

**SPECIAL SIZE**

MILLING  
CUTTERS



### SIDE MILLING CUTTERS

Precision made in U.S.A.

**IN STOCK FOR  
IMMEDIATE DELIVERY!**

DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
4	7/32	1	11.40
4	9/32	1	13.55
4	5/16	1	13.70
4	7/16	1	15.05
4	9/16	1	17.15
4	11/16	1	18.10
4	13/16	1	20.85
4	15/16	1	22.85
4	1	1	23.55
4	1 - 1/8	1-1/4	23.75
4	1 - 1/4	1-1/4	26.35
5	1/4	1	17.50
5	5/16	1	17.80
5	3/8	1	19.70
5	7/16	1	20.95
5	9/16	1	23.55
5	11/16	1	26.30
5	13/16	1	28.35
5	7/8	1-1/4	30.80
5	15/16	1	31.50
6	1/4	1	21.80
6	5/16	1	22.10
6	3/8	1	23.70
6	7/16	1	25.30
6	9/16	1	31.20
6	11/16	1-1/4	33.45
6	13/16	1-1/4	35.75
6	7/8	1	36.65
6	15/16	1-1/4	38.50
8	1/4	1	47.70
8	5/16	1	49.70
8	3/8	1	51.05
8	7/16	1	53.70
8	1/2	1	54.55
8	9/16	1-1/4	56.65
8	5/8	1-1/4	57.80
8	11/16	1-1/4	59.35
8	13/16	1-1/4	60.50
8	7/8	1-1/4	62.20
8	15/16	1-1/4	63.85
10	1/4	1-1/2	87.85
10	5/16	1-1/2	88.90
10	3/8	1-1/2	89.75
10	1/2	1-1/2	92.30
10	5/8	1-1/2	105.35
10	3/4	1-1/2	121.50
10	7/8	1-1/2	131.95
10	1	1-1/2	136.70
12	1/2	1-1/2	183.95
12	5/8	1-1/2	189.75
12	3/4	1-1/2	174.35
12	7/8	1-1/2	220.10
12	1	1-1/2	236.00

### STAGGERED TOOTH SIDE MILLING CUTTERS

Precision made in U.S.A.

**IN STOCK FOR  
IMMEDIATE  
DELIVERY!**



DIAM- ETER	WIDTH OF FACE	SIZE OF HOLE	PRICE EACH
5	1/4	1-1/4	20.95
5	5/16	1-1/4	21.85
5	3/8	1-1/4	23.20
5	5/16	1-1/4	26.60
6	7/16	1-1/4	31.55
6	9/16	1-1/4	38.70
6	11/16	1-1/4	40.55
6	13/16	1-1/4	42.15
6	15/16	1-1/4	44.55
8	3/16	1-1/4	63.20
8	7/16	1-1/4	66.80
8	9/16	1-1/4	70.55
8	11/16	1-1/2	75.85
8	13/16	1-1/2	79.35
8	7/8	1-1/2	83.25
8	1	1-1/2	87.35
10	5/16	1-1/2	87.80
10	3/8	1-1/2	89.10
10	7/16	1-1/2	95.70
10	1/2	1-1/2	99.70
10	9/16	1-1/2	119.85
10	5/8	1-1/2	113.10
10	3/4	1-1/2	129.35
10	7/8	1-1/2	133.30
10	1	1-1/2	139.20
12	1/2	1-1/2	180.45
12	5/8	1-1/2	170.95
12	3/4	1-1/2	181.45
12	7/8	1-1/2	221.65
12	1	1-1/2	238.95

### DEALER INQUIRIES INVITED

If you are a user of cutting tools it will pay you to be on our mailing list. We also stock special and standard sizes in slitting saws, end mills, etc. Write for circular now to Dept. B.

**SID TOOL COMPANY, INC.**

*Cutting Tool Specialists*

158 LAFAYETTE ST., NEW YORK 13, N. Y.

Telephone: BEekman 3-4270



## LASSY TAPPERS

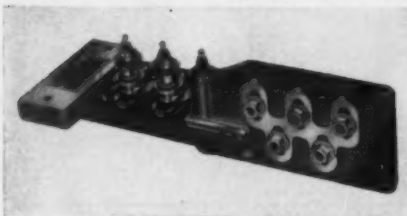
New exclusive features and top quality make Lassy Tappers outstandingly the finest available, for the tool room—small lot production—and the problem jobs. A low priced investment that soon pays for itself.

Write for illustrated circular showing 3 models, and also Universal Tap and Die Guide.

LASSY TOOL CO. Plainville, Conn.

Circle No. 464 on Card, Opposite Page 65

**economically priced  
press room equipment**



## DURANT Wire Straighteners

Takes round or flat wire and tubing. Five models available. Each unit consists of two sets of 5, 7, 9 or 11 grooved rolls.

Manufacturers of Stock Reels, Roll Feeds, Straighteners, Scrap Choppers, Die Pullers, Foot Presses, Coil Cradles, Press Guards, Stock Oilers.

WRITE FOR NEW FREE CATALOG

**DURANT TOOL SUPPLY Co.**  
PROVIDENCE 3, RHODE ISLAND

Circle No. 465 on Card, Opposite Page 65

multiple lip self-compensating rod gland packing contained in a removable cartridge which facilitates replacement without disassembling the cylinder.

Cylinders are available in bore sizes from 1½" to 8" inclusive. Ortman-Miller Machine Co., Dept. HS, 25 - 143rd St., Hammond, Ind.

Use ACTION Card, opposite page 64, Circle No. 175

## Jr. size marking machine

The Schmidt Model 365 hydraulic marking machine, for normal marking operations requiring up to 8000 lb. pressure, with a maximum lettering length of 3½", has a heavy die slide which operates on roller bearings.



Machine will mark lines of lettering with a knurl on flats up to 3-¾" long. It will mark lettering up to 3-¾" long on rounds rotating in cradle and up to 1-11/16" long on rounds which roll on table. Marking capacity: 4 lines of 1/16" characters; 3 lines of 3/32" or ¼" characters; 2 lines of ¼" characters. Production: 800 to 1000 parts per hour. George T. Schmidt, Inc., Dept. RB, 1802 Belle Plaine Ave., Chicago 13, Ill.

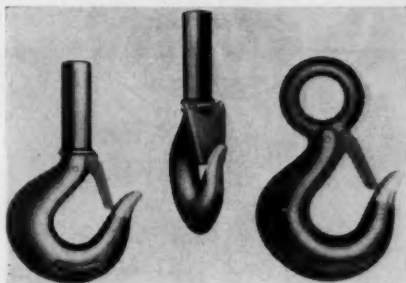
Use ACTION Card, opposite page 64, Circle No. 176

## Safety hoist hooks

Latches on Williams safety hoist hooks have powerful non-corrosive snap-springs. Loads cannot be jarred from the hook. Maximum throat opening is available. Latches are of sufficient size to allow the operator ample gripping area.

Hooks are available in both shank and eye patterns, load capacities from 1200 lb. to 30 tons. J. H. Williams & Co., Dept. RH, 400 Vulcan St., Buffalo 7, N.Y.

Use ACTION Card, opposite page 64. Circle No. 177



## Now! PRECISION EXPANDING MANDRELS

by  
**CHAMPION**



STANDARD  
MODEL

PRECISION  
MODEL

The expanding sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked in the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

**Precision Model** has expansion range of .010". Available in regular sizes to fit holes from 1/2" to 9 1/2" diam. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

**Standard Model** maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from 1/2" to 9 1/2" diameter.

CHAMPION Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.

Manufactured by WESTERN TOOL & MFG. CO., INC. • Sales Agents

# PATTON

MANUFACTURING COMPANY, INC.  
1802 West Pleasant St., Springfield, Ohio

**KEO****CENTER  
REAMERS****HIGH SPEED  
STEEL****3 FLUTES**

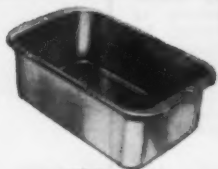
Cuts from  $\frac{1}{4}$ " to 1". Furnished with 60, 82, 90, 100, 110 or 120 degree included angle. Large stocks on hand. Other angles are special. Let us quote.

Jobbers' Inquiries Invited

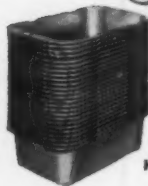
**KEO CUTTERS**

19326 Woodward - Detroit 3 Mich.

Circle No. 467 on Card, Opposite Page 65

**"PAK-N-STAK"****Bathey**

Leak proof drawn steel.  
Most economical pan  
offered to industry



Length 18"  
Width 11"  
Depth  $5\frac{1}{2}$ "

Nested



Stacked

Dealers in principal cities.

Write for catalogue

**BATHEY MFG. CO.**

200 SO. MILL ST.

PLYMOUTH MICH.

Circle No. 468 on Card, Opposite Page 65

**Air-operated automatic drill**

Simply press the starting button and this automatic drill performs a complete cycle, automatically. Motor starts, drill traverses rapidly to the work, feeds at pre-set rate while drilling hole, then retracts and shuts off when hole is completed.

There is a choice of 15 models and five speeds for processing a wide range of metals, from thin sheets up to tough 6" alloy steels. Drills can be used singly or in multiples and may be bench-mounted, suspended or locked to drill jigs.



Five-step work cycle of drill is accomplished by: four-way air valve, piston type, which can be operated manually or by remote control to start cycle and provide automatic return; rapid traverse stroke which moves drill rapidly to the work and shortens the time cycle; hydraulic feed control for precise feed rate according to job requirements; adjustable stroke length with micromic adjustment nut accurate to .002"; built-in automatic return which retracts the drill and completes the cycle.

Additional features include interchangeable gearing for fast conversion to any of four other speeds; adjustable air regulator for fine adjustment of motor speed, or to shut off air in motor and move piston forward for drill changing.

Available with 2", 4" or 6" stroke lengths; speeds of 4600, 2500, 1200, 650 and 350 r.p.m.; drilling capacity from  $\frac{1}{4}$ " to  $\frac{1}{2}$ " in mild steel,  $\frac{5}{16}$ " to  $\frac{1}{2}$ " in aluminum or brass. The Aro Equipment Corp., Dept. JS, Bryan, O.

Use ACTION Card, opposite page 64, Circle No. 178



### Multiple Spindle Magazine Feed Power Screw Driving Machines

Latest type equipment for driving screws faster in products requiring two or more screws. These machines operate easily and require very little attention or adjustment once they are put in production.

### Part Feeder

Model C Automatic Part Feeders provide an efficient means of feeding parts to Automatic Machinery. They are fast feeding, have large storage capacity and are easy to load.

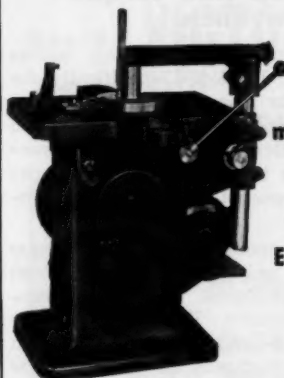
Pat. applied for.



**COOK & CHICK CO.**  
2415 WEST 24th ST.  
CHICAGO 8, ILLINOIS

Circle No. 469 on Card, Opposite Page 65

### "DAVIS" KEYSEATERS



are  
moderately  
priced  
Efficient  
Economical  
Durable

Built in 3 sizes for cutting keyways  
1/16" to 1" width. Circular  
upon request.

**DAVIS KEYSEATER CO.**  
407 1/2 Exchange St. Rochester 8, N. Y.

Circle No. 470 on Card, Opposite Page 65

## ROOFE LIVE CENTERS

**assure  
maximum  
accuracy!**

Users everywhere praise ROOFE Live Centers for increasing production, lowering costs, and for giving maximum accuracy.

Made of the finest alloy steels, standard types are available in Morse Taper, Brown & Sharpe, Jarno, straight or special shanks, to your specifications. Write for catalog.

Reliable distributors wanted.

**HOUSTON GRINDING & MFG. CO., Inc.**  
P. O. BOX 7261 • HOUSTON 8, TEXAS

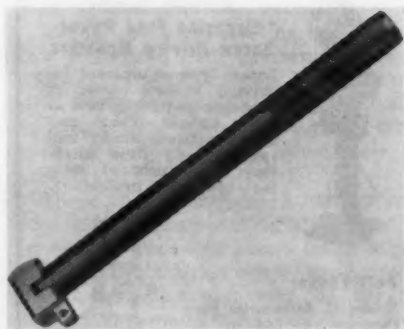
Circle No. 471 on Card, Opposite Page 65

## Production line torque limiting wrench

The Jotru torque limiting socket wrench was developed specifically for assemblies or construction operations where nuts or bolts require correct and uniform tightening. A hammering surface opposite the tang knocks out mismatched pieces of an assembly without damage.

The unit permits a maximum torque variation of only  $\pm 2\%$  under actual operating conditions. Control is completely automatic. When the proper torque has been applied, the wrench releases automatically and allows a few degrees of free rotation.

The smallest size, Jotru 25, a 10-inch wrench, has a drive size of  $\frac{3}{8}$  inch and affords a range setting of 5 to 25 foot-



pounds. Jotru 500, largest in the line, is 36 inches long, has a drive size of  $\frac{3}{4}$  inch, and a range of 200 to 500 foot-pounds. Jo-Line Tools, Inc., Dept. KE, 8442 Otis St., South Gate, Calif.

Use ACTION Card, opposite page 64. Circle No. 179

## You Can Rely on a ROUSSELLE



### THESE 40-TON PRESSES

take job after job in stride and give you top speed and uniform output on a variety of work. They stress simplicity in every detail to achieve quicker set-ups, easier changeovers and simpler operation. All are extra rugged, high precision units, made to withstand hard usage and assure long, satisfactory service. They are very moderately priced.

Manufacturers of Rousselle Presses

**SERVICE MACHINE CO.** 2310 West 78th Street • Chicago 20, Ill.

Significant savings may result if you let our engineering staff assist you. There is no obligation.

Rousselle Presses are sold exclusively through leading machinery dealers.

Choice of 25 models in 5 to 40-ton sizes.

Circle No. 472 on Card, Opposite Page 65

## Dacron after-filter bags available on dust collectors

Torit FB (bag-equipped) cyclone-type dust collectors will now be furnished with after-filter bags of Dacron cloth in place of the standard wool.



Tests proved that the Dacron cloth was fully as effective a filter medium as wool and would not burn when exposed to a continuous shower of sparks. In addition, the material will not shrink when laundered or be attacked by moths or mildew.

By using after-filters on Torit cyclones, a manufacturer can recirculate clean, heated air indoors, where regulations permit, instead of exhausting it out of doors, thereby reducing heating costs. Torit Mfg. Co., Dept. KPRB, 287 Walnut St., St. Paul 2, Minn.

Use ACTION Card, opposite page 64, Circle No. 100\*

Circle No. 473 on Card, Opposite Page 65

June, 1956

Great  
Buys  
For

## VICTOR'S 25TH ANNIVERSARY YEAR



*Our special import . . .*

### DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
1/4	\$ 6.00	\$ 2.85
1/2	12.00	5.00
3/4	21.00	7.50
1	30.00	10.25
1 1/2	54.00	15.00
2	75.00	20.00
2 1/2	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order today—Immediate  
Delivery from Stock!

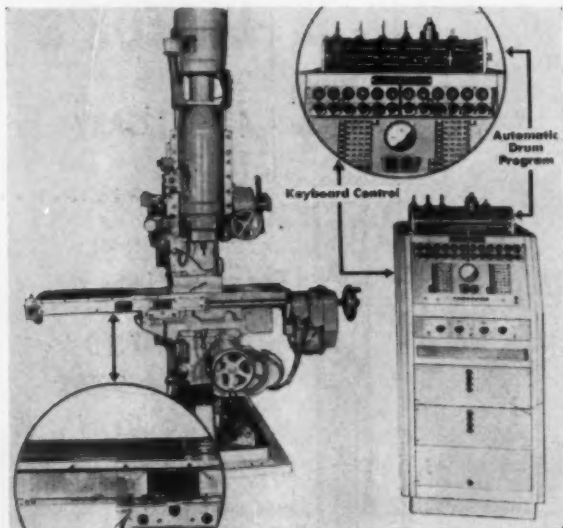
## VICTOR MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

Dept. A, 251 Centre St.

Tel.: CANAL 6-5575 New York 13, N.Y.

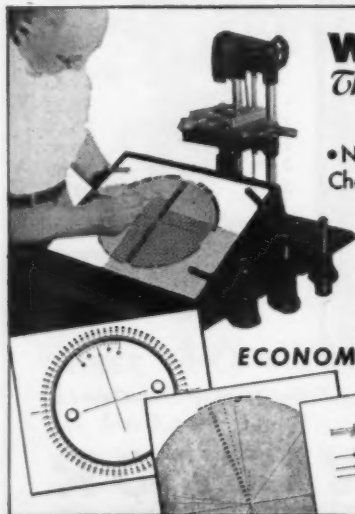
## Control Equipment Converts Milling Machine for Automatic Jig Boring



Milling machines can be converted for precise jig boring operations by the application of a linear Inductosyn for micro positioning and automatic control.

The system illustrated here provides for control of X and Y axes by the Inductosyn elements shown mounted along the table and cross slides of the miller, which are electronically actuated by a push button keyboard input control for X and Y positioning with a program drum providing for automatic operation of fifteen positions.

The control consists of



## WILDER PROJECTOR

*The MICRO-PROJECTOR with the VERTICAL DESIGN*

- New Gage Company Precision Plastic Comparator Charts made on non-changing, unbreakable material; available for 360° angular checking, radii, threads and special charts to your specifications.
- The Wilder so equipped will inspect faster, more accurately, without the need of to-scale manually built drawings.

**ECONOMY • ACCURACY • MODERATE PRICE**

**Geo. SCHERR OPTICAL TOOLS, Inc.**

**200-MT LAFAYETTE ST. • NEW YORK 12, N.Y.**

Circle No. 474 on Card, Opposite Page 63

precisely spaced metallic conductors on glass plates, comprising circuit elements, a scale which is attached to a stationary part of the machine and a slider carried by the moving part. These elements are mounted directly on the machine. Measurements are always referenced to an established zero reference.

The work performed on this machine consists of automatic sequential operations comprising boring and reaming of precisely located holes. While the inherent accuracy of the unit is .0001 inch with repeatability of 25 micro-inches, the accuracy of a machine equipped with Inductosyn is limited by the stability of the carriage, slides, etc. and the precision of the ways. Farrand Controls, Inc., 4401 Bronx Blvd., Dept. MG, New York 70, N.Y.

Use ACTION Card, opposite page 64. Circle No. 181

### Work positioner improved

Design changes in the redesigned Wilton PowRarm work positioner include



a new operating handle with a bakelite knob mounted well above bench top level. All steel parts are now cadmium plated to eliminate rust and corrosion. A new type of heavy duty finish has also been developed; it consists of a zinc chromate primer with an aircraft gray enamel finish. Wilton Tool Mfg. Co. Inc., Dept. RB, 9525 Irving Park Rd., Schiller Park, Ill.

Use ACTION Card, opposite page 64. Circle No. 182



*push — it's on*



*push — it's off*

the "original"  
dial indicator holder  
with  
push button control

Precision built to hold securely the best dial indicators.



## MAGNETIC BASE

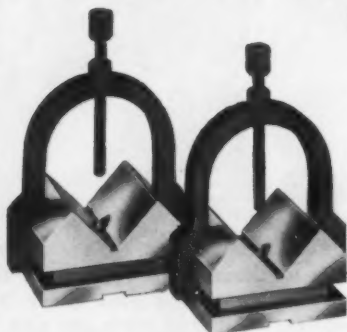
For descriptive literature and address of sales agent in your area, write to

JAMES NEILL & CO. (U.S.A.) LTD.  
37/39 PEARL STREET, NEW YORK 4.

Circle No. 475 on Card, Opposite Page 65

accurate to .0002" over 6"

## UNI-V-BLOCKS



by Precision Tool

This block is guaranteed accurate to a tolerance of .0002" T.I.R. in the following ways:

HOLE CENTER	All are accurate to each other to within .0002" over a matched pair. Dimensionally stabilized!
KEYWAY	
SIDES	
THE V	

Shown here is MODEL No. 3000  
(2-7/32 x 4-3/4 x 2-15/16")

**PRECISION TOOL AND MFG. CO.**  
of ILLINOIS  
1305 S. Laramie Avenue, Cicero 50, Illinois

Attach this ad to your letterhead for FREE literature!

UNI-V-BLOCKS are also available as:  
MODEL 5000 (4-5/16x5-1/8x5-3/8")  
MODEL 1250 (1-1/4x1-1/4x1-5/8")

MT-6

Circle No. 488 on Card, Opposite Page 65

## ACROMARKER

Stamps Name-Plates  
Stamps Machined Parts  
Stamps Tags and Scrap Metal  
Stamps Steel & other materials



It's a Patented Machine  
Made By "The Original  
Marking Specialists."  
Dies are Replaceable.

Write for latest color literature showing wide adaptability for easy numbering and lettering.

*The*  
**ACROMARK**  
*Company*

15 Morrell St.

Elizabeth 4, N.J.

Circle No. 476 on Card, Opposite Page 65

## Spin your RIVETS

faster and  
more economically  
on the NOISELESS

### LINLEY RIVETER



Rivet spinning on the Linley is a sure way to cut production costs. With Linley equipment, you can easily produce finely finished rivets even in close places. Send us samples of the work you want riveted, and without obligation we'll show you how it can be done the Linley-way and what it will cost.

Machines available for handling iron and cold rolled steel rivets up to 3/4" and larger size rivets in softer materials.

Send for Bulletin R today.

**LINLEY BROTHERS CO.**

Also builders of JIG BORERS

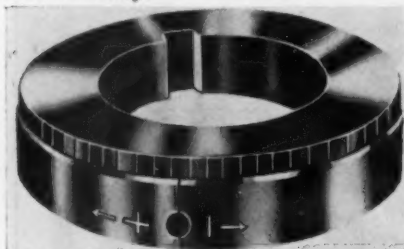
663 State St. Ext.

Bridgeport 1, Conn.

Circle No. 477 on Card, Opposite Page 65

## Collar for spacing multiple setups

For fast, accurate spacing of multiple setups on production milling machines and similar equipment, the Milling Mike adjustable spacing collar is calibrated in thousandths of an inch. Positive adjustments to split thousandths can be made visually.



Collar is available in six cutter arbor sizes:  $\frac{7}{8}$ ", 1",  $1\frac{1}{4}$ ",  $1\frac{1}{2}$ ",  $1\frac{3}{4}$ " and 2".

Dayton Rogers Mfg. Co., Dept. RB, 282-13th Ave. South, Minneapolis 7, Minn.

Use ACTION Card, opposite page 64, Circle No. 104

*New* **KNURLMASTER**  
**Hand Knurler**

**\$13.50**

No distortion—  
even on  $\frac{1}{8}$ " stock!  
**MODEL "C"**

For small production runs on  $\frac{1}{8}$ " to 1" stock. Exclusive screw design gives perfect knurl pattern. Furnished with 3 hardened knurls of standard  $\frac{1}{2}$ " dia. Forged steel frame is self-centering. Write for illustrated folder.

*Dealer Inquiries Invited*

## ROCKWIN MANUFACTURING CO.

80-C Magnolia St. Westbury, L.I., N.Y.  
Circle No. 479 on Card, Opposite Page 65

# NIELSEN

## Heavy Duty

### *Live Centers*

Write for  
catalog on  
live centers

Adapted  
for heavy  
duty work.  
Precision type  
ball and roller  
bearings assure  
maximum capacity  
for high speed  
production and long  
service.

**NIELSEN, INC.**

**LAWTON,  
MICH.**

Circle No. 478 on Card, Opposite Page 65  
June, 1956

Alloy  
Lead  
Hammers

Alumi-  
num  
Grip  
Handles

Hinged Hammer Moulds

1, 2½ and 5 lb. sizes—order your alloy lead  
hammer requirements from your machine tool  
supply house

or direct from:

**KITZMAN MFG. CO.**  
13061 Hortwell Ave. Detroit 27, Mich.

Circle No. 480 on Card, Opposite Page 65

## DON'T OVERLOOK THESE FEATURES

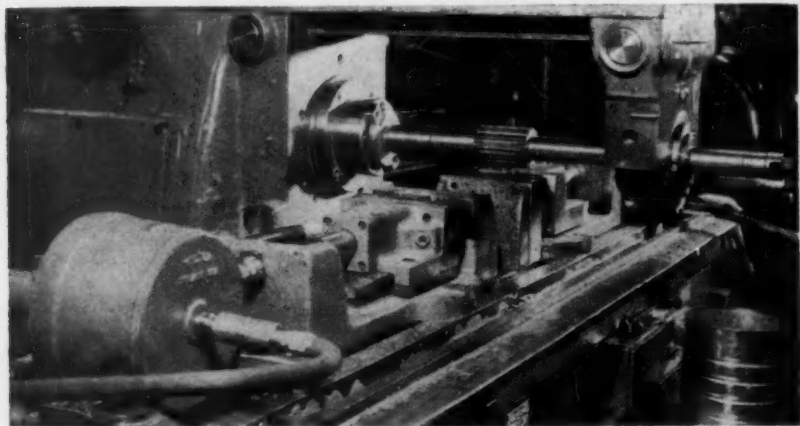
MACHINE AND TOOL

blue book

	PAGE
<b>Contest Winners.</b> Who are the prize winners? How much did they receive? What were the subjects of the nine winners in Blue Book's \$2,500 50th Anniversary Production Contest .....	105
<b>Safety.</b> Presteel's safety program has been outstandingly successful. Their work's manager presents a detailed account of their safety plan in action ....	110
<b>Grinding with Flex Wheels.</b> These new re-inforced flexible wheels will cut costs in your plant. Why? Because they're tough, fast cutting, versatile and are safe to use .....	116
<b>Tracer Controlled Lathe.</b> This lathe, when used with proper carbide tooling, upped production of one shop 400% .....	120
<b>Deep Hole Drilling.</b> How Douglas Aircraft solved its deep hole drilling problems with the use of gun drills is the subject of an 11-page feature well illustrated with charts, drawings and photos .....	132
<b>Flame Hardening.</b> The horizons for flame hardening are widening. Just what type of metalworking application can take advantage of this type of heat treating is discussed by one of the best authorities in this comparatively new process .....	148
<b>News of Automation.</b> Details of the installation of a numerical cam miller in Great Britain is informative and indicates how far this country has gone in the field of automation .....	161
<b>Labor Arbitration.</b> Three labor problems of three different companies are discussed from both the employer and employee standpoint. An arbitrator rules who is right or wrong in labor relations .....	175

a new tooling concept from Wilton!

## MILOMATIC AIR-HYDRAULIC VISES GIVE THE MARTIN CO. "NON-STOP" PRODUCTION!



Courtesy The Martin Aircraft Co., Baltimore, Md.

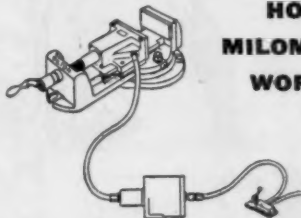
With Milomatic air-hydraulic vises, the Martin Company was able to equip this milling machine for automatic loading and continuous operation in the time required to tighten six bolts! The cost was far less than custom tooling, and both vises can be moved to other jobs in minutes. Milomatics can be equipped with inexpensive jaw inserts to hold work pieces of any shape—ideal for the quick changes in tooling demanded for today's production. Use them in your plant to boost productivity and gain new tooling versatility!

### MILOMATIC FEATURES!

- instantaneous automatic action
- self cleaning flat bed design
- vibration-free locking lengthens cutter life
- low and compact—nothing extends above the jaws



### HOW MILOMATIC WORKS



Touch of air control activates hydraulic booster which instantly applies 9000 lbs. of locking force to jaws. Power stroke is 7/16". Milomatics come complete with air-hydraulic system and controls.

Attach this Ad to your letterhead for free demonstration or literature!

# WILTON TOOL MFG. CO., INC.

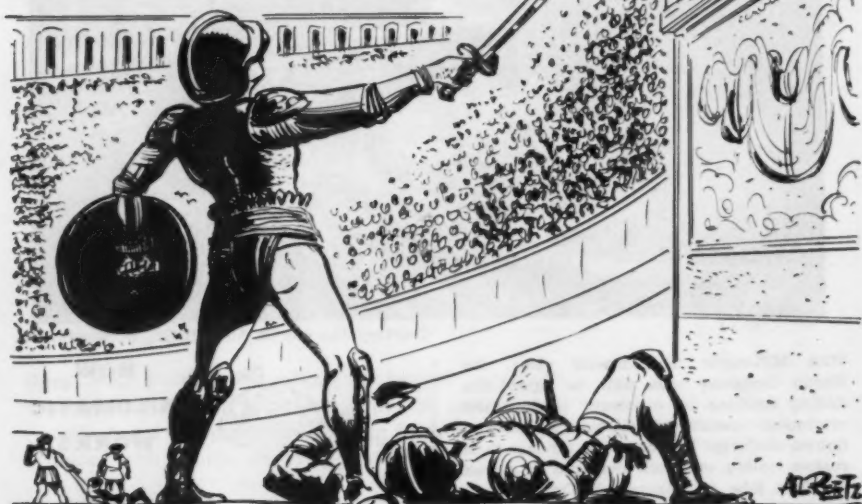
MT-6 SCHILLER PARK, ILLINOIS

Circle No. 481 on Card, Opposite Page 65

# Mechanics Through The Ages

**AS EARLY AS 350BC,**

THERE WAS ONE KIND OF STEEL FOR ORDINARY TOOLS; ANOTHER FOR AUGERS, CHISELS AND FILES; AND A THIRD VARIETY FOR SWORDS, RAZORS AND SURGICAL INSTRUMENTS!



**R**EVOLUTIONARY TO POWER TRANSMISSION WERE THE ROUND LINE SHAFTS AND BORED AND KEYED WHEELS THAT WILLIAM FAIRBAIRN OF ENGLAND DE- VISED IN 1818. UNTIL THAT TIME, ALL SHAFTING HAD BEEN SQUARE AND ALL GEARS AND FLYWHEELS HAD BEEN SECURED TO THEM BY CRUDE WEDGES.

**Arabian** CRAFTSMEN OF THE 1280's WERE THE WORLD'S FIRST MAKERS OF MUSKETS, IT IS SAID, AND THEIR METHODS WERE COPIED BY MANUFACTURERS IN **FLANDERS!**



a **MIGHTY** fine press...

built to withstand  
rigorous service

From crown to base, Minster S1's  
are truly MIGHTY presses. You get  
these features as Standard Construction:

- Box type cast construction for maximum rigidity
- All wear surfaces bronze lined, precision fitted and replaceable
- Minster patented Combination Multiple Disc Air Friction Clutch and Brake
- Exceptional Slide guiding and barrel type adjustment
- Air Counterbalances on slide
- Totally enclosed gears running in oil
- J. I. C. Dimensions

capacities  
from 50  
to 600 tons

Photo courtesy of Long Manufacturing Division,  
Borg-Warner Corporation, Detroit, Michigan.  
Minster S1-500 Press used in production  
of clutch coverplates for the automotive industry.

THE MINSTER MACHINE COMPANY  
Minster, Ohio

**MINSTER**®

MINSTER  
series **S1**

straight side single point  
presses

for drawing, forming, trimming  
or blanking.



# The MARKET PLACE

Advertisements acceptable in THE MARKET PLACE include those for employment, sales services, production facilities, representation and related needs. Rates: \$20 per column inch per insertion. Maximum size advertisement accepted in this section is three inches.

Copy should reach us by the first of the month for next month's issue.

**MACHINE and TOOL BLUE BOOK**  
A Hitchcock Publication Wheaton, Ill.

simplify preventive maintenance with  
**MACHINE TOOL RECONDITIONING**  
& the Art of Hand Scraping (New 2nd printing)—useful for design, shop & inspection work—

Write for folder describing illustrated book  
**MACHINE TOOL PUBLICATIONS**  
215 Commerce Bldg., East 4th St.  
St. Paul 1, Minn.

**F. A. LUTHY COMPANY**  
MANUFACTURERS OF THREAD  
MILLING CUTTERS AND FORM  
CUTTING TOOLS.

Attention: Manufacturer's Agents  
WRITE FOR TERRITORY & SALES  
OPPORTUNITY

**F. A. LUTHY COMPANY**  
JACKSON, MICHIGAN, U.S.A.

MAKE DIES, TOOLS, METAL STAMPING,  
JIGS - FIXTURE, PRECISION MACHINERY  
WORK, PRODUCTION.

Mail Blue Print for Quotations

**KARL'S MACHINE SHOP**

30-51 23rd Street  
LONG ISLAND 2, NEW YORK

**Masters' ARBOGA**  
with  
Low Cost - High Quality  
Vertical Mills - Drills & Grinders

For further information, write to

118-122 Church St. 3611 Archer Ave.  
Newtown, Ohio Chicago 9, Ill.

**END MILLS SHARPENED**  
good as new - - - or better

.85 per end from 3/16 to 15/16 dia.  
1.25 per end from 1" to 1 1/2" dia.

Return postage paid on orders for  
\$25.00 or better. 1 week delivery.

We also sharpen carbide end mills.

Prices upon request.

**CUTTING TOOLS, INC.**  
134 Seymour Street  
Stratford, Conn.

10 to 12 foot lengths  
Any diameter up to 1 1/4 inch  
All thread forms  
All metals



**H & G**  
threaded  
rods

For studs,  
hangers, worms,  
translating screws, etc.

25-43 Barelay St.  
Eastern Machine Screw Corp. New Haven, Conn.

**SLOTING SAWS RESHARPENED**

We specialize in regrounding your Screw  
Slotting Cutters—Jewelers Slotting Saws  
and Metal Cut-Off Saws up to 8" Diameter  
All Work Precision Ground.

**CONNECTICUT CIRCULAR SAW SERVICE**

1911 Park Street Hartford, Connecticut

Don't forget to mention **MACHINE and TOOL BLUE BOOK**  
when writing advertisers, or use the handy Readers'  
Service card opposite page 64.

# INDEX TO PRODUCTS IN THIS ISSUE

MACHINE AND TOOL

blue book

## A

Abrasive Belt Machines, 306  
Abrasive Cloth, Paper Discs, Wheels, Stones,  
Belt, etc., 171, 176, 239  
Abrasives, rubber bonded, 176  
Adapters, 52  
Air Circulation Equipment, 238  
Alloys, 86, 104, 207  
Angle Plates, 279  
Angles, 302  
Assembly Machines, 55

## B

Backrests, carbide, Back Cover  
Backrests, roller, Back Cover  
Backrests, universal, Back Cover  
Bags, shipping, 32  
Band Saw Wheels & Guides, 295  
Bars, 104, 207, 223  
Base, magnetic, 319  
Bases, Index, automatic, 281  
Basic Machines, 145  
Bearings, 40  
Belt Sanders, 300  
Bending Equipment, 289  
Bending Machines, 52  
Blades, cut-off, 155, 199  
Blades, rotary shear, 227  
Blanks, circular form tools, 64  
Block Tooling, 33  
Boring Bars and Tools, 33  
Boring Bits, 33  
Boring, Drilling, Tapping Machine, 33  
Boring, Facing Machines, 33  
Boring, Facing Tools, 33, 43  
Boring Heads, 33, 98, 235, 263, 299  
Boring Machines, ID, 16-17, 33, 90  
Boring Machines, multiple-spindle, 1D  
Boring Mills, 33  
Boring Service, 305  
Boring Spindles, 209  
Boring Tools, 33, 43, 98  
Brakes, press, bending, 26-27, 78, 183  
Brass Stock, 191  
Broaching Attachments, 189  
Broaching Machines, 102, 189  
Broaching Tools, 102  
Brushes, industrial revolving, 249  
Brushing Machines, 249  
Buffing Machines, 101  
Burs, 217  
Bushings, 37, 60, 252  
Bushings, aligning, 37  
Bushings, carbide insert, 252  
Bushings, drill jig, 60, 141, 304  
Bushings, guide pin, 205, 219

## C

Cam Grinding, 305  
Cam Milling, 305  
Cams, 273, 304  
Carbide Plating, 50  
Carbide Stock, 86, 158, 207  
Carbide Tools, 61, 86, 153, 217, 260, 289  
Centers, live, 241, 255, 259, 291, 308, 315, 321  
Chain Making Machines, 30  
Chuck Nuts, 1A  
Chucks, 46, 228, 276, 298, 335  
Chucks, collet, 295  
Chucks, compensating, 46  
Chucks, power, 46  
Chucks, safety, 335  
Clamps, 56, 288  
Clamps, machine tool, 288  
Clamps, swivel pad, 163  
Clamps, toggle, 56  
Clinchers, 192  
Clutches, 329  
Coil Cradles, 224  
Collet Sleeves, 1A  
Collet Tubes, 336  
Collets, 1A, 292, 308, 336  
Comparators, internal, 173  
Comparators, dial, 67  
Comparators, millionth, 173  
Control Unit, electronic, 13  
Coolant, Filters, 68  
Coolants, 14-15, 199  
Counterbores, 18-19, 153, 269  
Countersinks, 18-19, 153, 227  
Cut-off Blades, Back Cover, 155, 199  
Cut-off Machines, 72, 160  
Cut-off Wheels, 160  
Cutters, 16-17, 192, 289  
Cutters, keyseat, 290  
Cutters, slotting, 79  
Cutting Fluid, Oils, 14-15, 199  
Cutting Tools, 18-19, 60, 74, 173, 227, 311  
Cutting Wheels, 160  
Cylinders, hydraulic, pneumatic, 1, 36, 102

## D

Dairy Equipment, 60  
Dial Comparators, 67  
Dial Indicator Holders, 319  
Dial Indicators, 67  
Dial Micrometers, 67  
Diamond Powder, 289  
Diamond Tools, 289  
Diamond Wheel Dressers, 317  
Diamond Wheels, 289  
Diamonds, industrial, 289  
Die Casting Machines, 82

P  
R  
O  
D  
U  
C  
T  
S  
  
I  
N  
D  
E  
X

Die Cushions, 78  
Die Filers, 286  
Die Flippers, 213  
Die Heads, 93  
Die Making Machines, 31  
Die Sections, 158  
Die Sets, 21, 47, 71, 97, 229, 237, 304  
Die Springs, 229  
Dies, 55  
Dies, carbide, 47  
Dies, press brake, 263  
Draw Bars, 308  
Dressers, angle, 307  
Dressers, radius, 307  
Dressers, wheel, 213, 317  
Dressing Tools, 289  
Drill Heads, 235, 283  
Drill Holders, floating, Back Cover  
Drill Press, micro, 143  
Drilling Attachments, multiple spindle, 287  
Drilling Machines, 52, 127, 251  
Drilling Machines, bench, 143, 251  
Drilling Machines, horizontal, 233  
Drilling Machines, multiple spindle, 1D  
Drilling Machines, precision, 127, 251  
Drilling Machines, radial, Inside Back Cover, 84, 233, 265  
Drilling Machines, upright, 84  
Drilling Spindles, 53  
Drills, 18-19, 61, 227, 240, 311  
Drills, carbide, 153  
Drills, taper, 267  
Drivers, tap, 53  
Drives, gearshift, 89  
Duplicating Attachments, 76, 264  
Dust Control, 245

## E

Electrical Discharge Machining, 174  
Electronic Control Unit, 13  
End Mills, 18-19, 147, 177, 199  
Engravers, 23, 65  
Engraving Tools, 289  
Extruded Shapes, 191

## F

Fabricating Machines, 230  
Facing Heads, 263, 290  
Facing Machines, 1D  
Facing Tools, 269  
Fans, 238  
Fastening Tools, 28  
Feed Fingers, 1A  
Feeders, parts, 315  
Feeds, press, 30  
Feeds, roll, 224, 226, 244  
Feeds, slide, 30  
Filters, die, 286  
Files, 77, 231  
Filing Machines, 298  
Filters, 68  
Fixture, Form Relief, 73  
Flanging Machines, 259  
Flexible Shaft Equipment, 248  
Flexible Shaft Machines, 248  
Floating Holders, 129  
Floating Drill Holders, Back Cover  
Floor Cleaners, 296  
Form Relieving Fixture, 73

Form Tools, 64  
Forming Machines, 30, 55  
Furnaces, heat-treating, 156, 266, 277

## G

Gage Blocks, 20, 173  
Gages, 45, 61, 74, 166, 173, 211  
Gages, dial, 67  
Gages, electronic, 211  
Gages, groove, 157  
Gages, height, 20  
Gages, internal, 256  
Gages, plug, 256  
Gear Cutting Machines, 123  
Gear Hobbers, 123  
Gear Production Equipment, 38-39  
Gear Shapers, 38-39  
Gear Shift Drives, 89  
Gears, 294, 300  
Graduating Machines, 23  
Grinders, 179  
Grinders, bench, 131, 257  
Grinders, carbide tool, 179, 257  
Grinders, centerless, 8-9  
Grinders, centertype, 8-9  
Grinders, chamfer, 285  
Grinders, cutter, 16-17, 179  
Grinders, cylindrical, 179  
Grinders, disc, 101, 182  
Grinders, drill, 3, 31, 274, 285  
Grinders, face mill, 31  
Grinders, flute, 285  
Grinders, heavy duty, 101, 257  
Grinders, internal, 29, 179  
Grinders, jig, 55, 213  
Grinders, Micro-centric, 8-9  
Grinders, portable, air, 12, 69, 282  
Grinders, saw, 255  
Grinders, surface, 1B, 131, 179, 201, 239  
Grinders, tap, 3, 303  
Grinders, template tool, 31  
Grinders, thread, 289  
Grinders, tool & cutter, 31  
Grinders, universal, 29  
Grinders, wet or dry, 182  
Grinding Heads, 55  
Grinding Spindles, 60, 209  
Grinding Wheels, 176, 239  
Grooving Heads, 263  
Guide Pin Rushings, 205, 219

## H

Hammers, soft-faced, 246, 266, 321  
Hinges, 295  
Holders, back rest, Back Cover  
Holders, cut-off blade, Back Cover  
Holders, dial indicator, 319  
Holders, floating, 129  
Holders, roll type, Back Cover  
Holders, tap & die, Back Cover  
Holders, tool, 4, 86, 269  
Holding Fixtures, 129  
Hole Location Accessories, 213  
Hollow Tool Steel, 223  
Honing Fixtures, 7, 215, 288  
Honin Machines, 7, 215  
Honin Tools, 7, 215

# BEST

# BUYS

**"The  
Clutch  
of  
Robust  
Refinement"**

## CONWAY CLUTCH

**If you use POWER**

**You need CONWAY CLUTCHES**

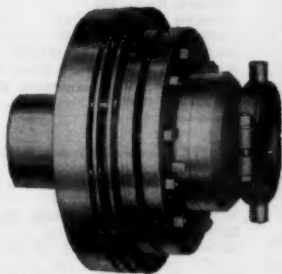
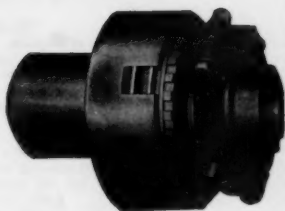
From start to finish . . . for that "light touch" for an instant or for continuous, over-capacity operation . . . these clutches do a man's size job. Their scientifically designed, precision-built accuracy and amazing brute strength are true guardians of thrift in operation, maintenance and enduring efficiency.

For every industry - wherever power is transmitted from source to productive equipment.

Standardized, interchangeable parts built from basic materials.

**THE CONWAY CLUTCH CO.**

**1105 Marshall St.  
Cincinnati 25, Ohio**



**WRITE FOR  
NEW BULLETINS**

# I

Index Base, 281  
Index Tables, 55, 273  
Indicators, dial, 67  
Indicators, surface, 211  
Inspection & Measuring devices, 13, 45, 67, 166, 178, 211, 304

# J

Jig Bore, 74, 213  
Jig Boring, 305, 306  
Jig Grinders, 218

# K

Keys, fixture, 163  
Keyseat Cutters, 296  
Keyseaters, 304, 315  
Knives, circular, 227  
Knobs, hand, 305  
Knurling Tools, Back Cover, 321

# L

Lapping Machines 8-9, 75, 234  
Lathes, 29, 59, 165, 194, 202  
Lathe Dogs, 4  
Lathes, general purpose, 165  
Lathes, hand turret, 2  
Lathes, high speed, 59  
Lathes, precision, Inside Back Cover  
Lathes, tool, gage-makers, 2  
Lathes, turret, 2, 180-181, 225  
Layout Dye, 310  
Limit Switches, 301  
Lubricants, 278  
Lubricators, 197

# M

Machining, electrical discharge, 174  
Magnetic Bases, 319  
Mandrels, expanding, 313  
Marking Equipment, 320  
Marking Machines, 169, 284, 320  
Master Setting Rings and Discs, 99  
Materials Handling Equipment, 314  
Measuring, Checking Equipment, 166, 173  
Microcomparators, 211  
Micrometers, 173  
Micrometers, dial, 67  
Microscope, measuring, 20  
Milling Cutters, 18-19, 199, 242, 311  
Milling Heads, 235  
Milling Machine Attachments, 10, 235  
Milling Machine Dogs, 4  
Milling Machines, 16-17, 57, 58, 63, 90, 243, 261, 307  
Milling Machines, bench, 243, 307  
Milling Machines, horizontal, 57  
Milling Machines, hydraulic, 261  
Milling Machines, vertical, 57, 63, 100  
Milling Spindles, 209  
Mills, hollow, 272  
Mist Collectors, 245  
Molding Machines, 249

Moldings, plastic, 247  
Motor Arbors, 193  
Motors, electric, 89, 193

# N

Notching Equipment, 270  
Notching Units, 270  
Nut Runners, 28  
Nuts, micro, 53

# O

Optical Inspection Devices, 318  
Ovens, 277

# P

Pans, tote, 314  
Packings, mechanical, 75  
Pantographs, 23, 65  
Parallels, 302  
Piercing Machines, 55  
Pipe Fittings, 294  
Planers, 11, 80-81  
Plastic Moldings, 247  
Plastic Tooling, 55  
Plates, angle, 279  
Plates, steel, 104  
Plates, surface, 302  
Plating, carbide, 50  
Plungers, spring, 163  
Polishing Machines, 182, 234  
Portable Air Tools, 12, 28, 69, 282  
Porting Tools, 289  
Press Brake Dies, 263  
Press Brakes, 26-27, 42, 78, 183  
Press Feeds, 30  
Presses, air, 42, 139, 159, 183  
Presses, arbor, 159  
Presses, bench, 42, 243  
Presses, blanking, 325  
Presses, deep-throat, 316  
Presses, double crank, 139, 316  
Presses, drawing, 325  
Presses, drill, 143, 159  
Presses, foot, 159  
Presses, forming, 325  
Presses, horn, 316  
Presses, hydraulic, 78, 297  
Presses, mechanical, 139  
Presses, O.B.I., 139, 183, 316  
Presses, power, 159, 183  
Presses, punch, 54, 243, 262  
Presses, single crank, 139  
Presses, single point, 325  
Presses, straight side, 325  
Presses, transmat, 78  
Presses, trimming, 325  
Presses, turret punch, 54  
Profiling Machines, 2, 23  
Projectors, 318  
Pumps, coolant & lubricant, 199  
Punches, 70, 289  
Punches & Dies, 270  
Punching Equipment, 270  
Punching Machines, 52  
Pushers, 336  
Pushers & Pads, 1A  
Pusher Tubes, 336

## R

Railroad Pins and Bushings, 60  
Reamers, 18-19, 61, 153, 227, 240, 269, 289, 314  
Reamers, carbide, 289  
Recessing Tools, Back Cover, 309  
Reels, stock, 30, 224, 244  
Reinforcing Steel, 104  
Rivet Setters, 95  
Rivet Spinners, 320  
Riveting Machines, 192, 263, 320  
Rivets, 95  
Rod Parters, 76  
Roll Feeds, 224, 226, 244  
Rotary Tools, 12, 28, 69

## S

Sanders, belt, 300  
Sanders, portable, 300  
Saw Blades, band, Inside Front Cover, 1C, 62, 77, 260  
Saw Blades, circular, 77, 227  
Saw Blades, hack, Inside Front Cover, 1C, 62, 77, 280  
Saw Frames, hack, 62  
Saw Sharpeners, 255  
Sawing Machine Accessories, 295  
Sawing Machines, Inside Front Cover, 298  
Sawing Machines, band, 159, 200, 260  
Sawing Machines, cut-off, 41  
Sawing Machines, hack, 41  
Saws, carbide-tipped, 227  
Saws, cut-off, 227  
Saws, metal-cutting, 41, 200  
Saws, slitting, 199, 227  
Screw Drivers, power, 28, 315  
Screw Machines, automatic, 48-43, 82, 103  
Screw Sets, transfer, 304  
Screws, cap, set, socket & machine, 66, 236  
Screws, torque thumb, 163  
Settling Rings and Discs, 99  
Shaft Seals, 75  
Shapers, 26-27, 80-81  
Shearing Machines, 26-27, 52, 303  
Shears, alligator, 303  
Shears, hand, 306  
Shears, power squaring, 159  
Sheets, steel, 104, 207  
Shell End Mills, 199  
Shipping Bags, 32  
Slotters, 80-81  
Slotting Cutters, 79  
Socket Screw Products, 66, 236  
Sorting Units, 211  
Special Machinery, Inside Back Cover, 1D, 24-25, 102, 183  
Special Tools, 47, 55, 153  
Speed Reducers, 294  
Spindle Extensions, 53  
Spindles, 60, 209  
Square Hole Drills, 304  
Squares, steel, 221  
Stainless Steel, 104  
Staple Making Machines, 30  
Steel Blue, 293  
Steel and Steel Stock, 104, 158, 207, 223  
Steel Squares, 221  
Step Blocks, 290  
Stock Forming Machines, 30

Stock Reels, 30, 224, 244  
Stock Straighteners, 30, 224, 244, 295, 307, 312  
Stop Stock, revolving, Back Cover  
Stops, spring, 163  
Straight Edges, 302  
Straighteners, 30, 224, 244, 295, 307, 312  
Structurals, 104  
Surface Finish Standards, 285  
Surface Grinding, 305  
Surface Plates, 302  
Switches, limit, 301

## T

Tables, duplicating, 264  
Tables, elevating, adjustable, 125, 297  
Tables, positioning, 179  
Tables, rotary, index, 55, 273  
Tap Die Holders, Back Cover  
Tap Cartridges, 253  
Tap Drivers, 53  
Tappers, 250, 287, 312, 335  
Tappers, automatic reverse, 283  
Tappers, horizontal & vertical, 250  
Tapping Attachments, 59, 287, 335  
Tapping Heads, 287, 335  
Tapping Machines, 1D  
Tapping Machines, multiple spindle, 1D  
Taps, 18-19, 61, 253, 311  
Taps, collapsible, 93  
Teflon Products, 75  
Thread Compounds, 75  
Thread Cutting Die Heads, 93  
Thread Grinding Service, 305  
Thread Rolling Machines, 22, 44  
Threading Machines, 93  
Toggle Pads, 163  
Tool Heads, 263  
Tool Holders, 86, 269  
Tool Posts, Back Cover  
Tool Steel, 158  
Tooling, 78  
Tooling Service, 296  
Tote Pans, 314  
Transfer Machines, 55  
Transfer Screw Sets, 304  
Tubing, 104, 207  
Turning Heads, 263  
Turning Tools, Back Cover, 289  
Turret Tool Posts, 308  
Turrets, lathe, 286

## U

Undercutting Heads, 263

## V

V-Blocks, 279, 290, 320  
Valves, air, 34-35, 36, 224  
Valves, hydraulic, 34-35, 36  
Vises, bench & machine, 271, 289, 293, 299, 304, 305, 323

## W

Wheel Dressers, 213, 317  
Wire & Stock Reels, 30, 224, 244  
Wire Straightening Machines, 312  
Wrenches, automatic, 275

# INDEX TO ADVERTISERS

MACHINE AND TOOL

blue book

## A

Aaron Machinery Company	57
Abart Gear and Machine Company	294
Abrasive Products, Incorporated	171
Ace Drill Bushing Company	141
Ace Drill Corporation	240
Acme Danneman Company, Inc. (Danneman Die Set Division)	304
Acme Tool Co.	290
Acromark Company	320
Aget Manufacturing Company	245
Allegheny Ludlum Steel Corporation	158
Allen Collet Manufacturing Company	336
Allied Products Corporation	219
American Brass Company	191
American Broach & Machine Company	102
American Chain & Cable Company (Campbell Machine Division)	160
American Machine & Foundry Company (AMF Tool Division)	271
American Saw & Manufacturing Co.	192-C
American Tool Works Co. .... Inside Back Cover	
Ames Company, B. C.	67
Amidon Engineering Company	294
Armstrong-Blum Mfg. Co. Inside Front Cover	
Armstrong Brothers Tool Company	4
Arter Grinding Machine Co.	179
Atrax Company	217
Auto Moulding and Manufacturing Co.	294

## B

Baker Brothers, Inc.	145
Baldor Electric Company	257
Barker Engineering Company	307
Barnes Drill Company	68
Bathley Manufacturing Company	314
Beaver Gear Works, Inc.	300
Bellows Company	1
Benchmark Manufacturing Company	243
Benco Collet Manufacturing Company	192-A
Besly-Welles Corporation	61
Black Diamond Saw & Machine Works	274
Blake Company, Edward	285
Blanchard Machine Company	239
Blue Valley Machine & Mfg. Co.	259
Boggis & Company, Henry P.	303
Bokum Tool Company	43
Bremil Manufacturing Company	306
Brightboy Industrial Division (Weldon Roberts Rubber Company)	176
Bryant Gage & Spindle Division	157
Buckeye Tools Corporation	28
Buck Tool Company	46
Buffalo Forge Company	52
Busch Company, J. C.	302

## C

Campbell Machine Div. (American Chain & Cable)	160
Carlton Machine Tool Company	233
Carter Products Company	295
Chandler Tool Company	263
Chicago Latrobe	153
Chicago Mfg. & Distributing Co.	278
Chicago Rawhide Manufacturing Co.	246
Chicago Rivet & Machine Company	95
Cincinnati Bickford Tool Company	84
Cincinnati Grinders, Inc.	8-9
Cincinnati Shaper Company	26-27
Circular Tool Company	227
Clemson Brothers, Inc.	62
Cleveland Automatic Machine Company	82
Cleveland Instrument Company	211
Clipper Diamond Tool Company	289
Columbus Die-Tool and Machine Co.	296
Commander Manufacturing Company	287
Comtor Company	256
Conical Tool Company	267
Connecticut Circular Saw Service	326
Continental Tool Works (Div. Ex-Cell-O Corporation)	189
Conway Clutch Company	329
Cook & Chick Company	315
Cook Incorporated, Lawrence H.	306
Cooper Weymouth, Incorporated	295
Crane Packing Company	75
Criterion Machine Works	98
Crucible Steel Company of America	223
Cutting Tools, Inc.	326

## D

Danly Machine Specialties, Incorporated	21
Danneman Die Set Division (Acme Danneman Company)	304
Davis Keyseater Company	315
Dayton Rogers Manufacturing Company	247
Dearborn Gage Company	99
Denison Manufacturing Company, R. B.	301
Detroit Die Set Corporation	97
DeVlieg Machine Company	90
DeWitt Equipment Corporation	221
Donovan Manufacturing Company	293
Dreis & Krump Manufacturing Company	263
duMont Corporation	172
Durant Tool Supply Company	312
Dykem Company	293

## E

Eastern Machine Screw Corporation .....	326
Eisler Engineering Company, Inc. ....	273
Elox Corporation of Michigan .....	174
Empire Tool Company .....	155
Enco Manufacturing Company .....	286
Ex-Cell-O Corporation .....	60, 189

## F

Falls Products, Inc. ....	255
Famco Machine Company .....	159
Fellows Gear Shaper Company .....	38-39
Fen Machine Company .....	275
Ferracute Machine Company .....	183
Fischer Machine Company .....	184
Flynn Manufacturing Company .....	299
Fostoria Pressed Steel Corporation .....	238
Fulmer Company, C. Allen .....	7

## G

Galland-Henning Company .....	36
(Nopak Division)	
Gallmeyer & Livingston Company .....	201
Giddings & Lewis Machine Tool Co. ....	33
(Davis Boring Tool Division)	
Gisholt Machine Company .....	180-181
Glenzer Company, J. C. ....	241
Grant Manufacturing & Machine Co. ....	263
Gray Company, G. A. ....	11
Greaves Machine Tool Company .....	63
Green Instrument Company .....	65
Greenerd Arbor Press Company .....	297
Greenlee Brothers & Company .....	103
Grob, Inc. ....	298

## H

Hall Manufacturing Company .....	298
Hamilton Tool Company .....	123-125-127
Hammond Machinery Builders .....	3
Hariq Manufacturing Corporation .....	47
Hartford Special Machinery Company .....	44
Haskins, Company, R. G. ....	69
Heller Tool Company .....	231
Hendley and Whittemore Company .....	303
Hi-Lo Tool Products Company .....	288
Himoff Machine Company .....	305
Homstrand, Inc. ....	59
Horton Chuck .....	228
Houston Grinding & Mfg. Company .....	315
Huppert Company, K. H. ....	277

## I

Illinois Metal Products Company .....	305
Industrial Electronics, Inc. ....	13
Ingersoll Milling Machine Company .....	16-17

## J

Jiffy Manufacturing Company .....	32
Johnson Gas Appliance Company .....	156
Johnson Machine & Press Corporation .....	139

Johnson Manufacturing Corporation .....	260
Jones & Lamson Machine Company .....	37, 51

## K

Kalins & Company, J. M. ....	264
Karl's Machine Shop .....	326
Kaufman Manufacturing Company .....	250
Kenco Manufacturing Company .....	262
Kent-Owens Machine Company .....	261
Keo Cutters .....	314
Kidde Precision Tool Corporation .....	304-306
Kitzman Manufacturing Company .....	321

## L

Lamina Dies & Tools, Inc. ....	205
Landis Machine Company .....	93
LaPeer Manufacturing Company .....	56
Lassy Tool Company .....	279-312
Levin & Son, Inc., Louis .....	143
Lima Electric Motor Company .....	89
Lincoln Park Industries, Inc. ....	50
Linley Brothers Company .....	320
Littell Machine Company, F. J. ....	224
Logan Engineering Company .....	165
Lucifer Furnaces, Inc. ....	266
Luthy Company, F. A. ....	326

## M

Machine Tool Publications .....	326
Madison-Kipp Corporation .....	282
Martin Machine Company, J. E. ....	304
Marvel Tool & Machine Company .....	259
Maserati Corporation of America .....	100
Masters Precision Tools .....	326
Matthews & Company, Jas. H. ....	284
Maxwell Company .....	309
McCroskey Tool Corporation .....	79
Melin Tool Company .....	147
Meyers Company, Inc. W. F. ....	252
Michigan Chrome & Chemical Company .....	310
Midwest Tool & Engineering Company .....	297
Minster Machine Company .....	325
Modern Machine Tool Company .....	72
Moore Special Tool Company .....	213
Morris Machine Tool Company .....	24-25
Morse Twist Drill & Machine Company .....	18-19
Motch & Merryweather Company .....	199
Mummert-Dixon Company .....	290

## N

National Acme Company .....	48-49
National Automatic Tool Company .....	192-D
Neill & Company, Ltd., James .....	319
Nelco Tool Company .....	242
New Britain Tool & Mfg. Company .....	289
New Hermes Engraving Machine Corp. ....	23
Nichols-Morris Corporation .....	58
Nielsen, Incorporated .....	321
Nielsen Tool & Die Company .....	304
Nilson Machine Company, A. H. ....	30
Noble & Westbrook Mfg. Company .....	169
Norgren Company, C. A. ....	197
Norma-Hoffman Bearings Corporation .....	40

# O

Oliver Instrument Company .....	31
Oliver Machinery Company .....	182
O'Neil-Irwin Manufacturing Company .....	76
Osborn Manufacturing Company .....	249

# P

Patton Manufacturing Company .....	313
Penniman Company, Elisha .....	302
Perkins Machine Company .....	42
Pivot Punch & Die Corporation .....	70
Plunket Machine Company, J. E. ....	299
Pope Machinery Corporation .....	209
Porter Co., Inc., H. K. ....	280
(Henry Disston Div.) .....	
Pratt & Whitney Company .....	74-173
Prebco Bushing Company .....	304
Precision Tool & Mfg. Co. of Illinois .....	320
Procurier Safety Chuck Company .....	355
Producto Machine Company .....	71
Pruitt Corporation .....	22
Putnam Tool Company .....	177

# Q

Queen City Machine Tool Company .....	101
---------------------------------------	-----

# R

R and L Tools .....	Back Cover
Racine Hydraulics and Machinery, Inc. ....	41
Reading Machine Company .....	304
Reid Brothers' Company, Incorporated 192-B .....	
Richards Company, J. A. ....	289
Rivett Lathe & Grinder, Inc. ....	29-292
Rockford Machine Tool Company .....	80-81
Rockwin Manufacturing Company .....	321
Roll Feeds Corporation .....	226
Ross Operating Valve Company .....	34-35
Rotor Tool Company .....	12
Royal Oak Tool & Machine Company .....	73
Royal Products .....	308
Rusnok Tool Works .....	235
Ruthman Machinery Company .....	198
Ryerson and Son, Incorporated, Joseph T. 104 .....	

# S

Sales Service Machine Tool Company .....	286
Sanford Manufacturing Corporation .....	131
Scherr Company, Inc., George .....	318
Schmarje Tool Company .....	289
Scully-Jones & Company .....	129
Seibert & Sons, Inc. ....	53
Service Machine Company .....	316
Sheffield Corporation .....	45

Sheldon Machine Company .....	202
Sid Tool Company .....	311
Sidney Machine Tool Company .....	194
Sigourney Tool Company .....	251
Simonds Saw & Steel Company .....	77
Somma Tool Company .....	64
Sperman Metal Specialties .....	307
Standard Die Set Manufacturers .....	229
Standard Gage Company .....	166
Standard Pressed Steel Company .....	66
Standard Steel Specialty Company .....	301
Stow Manufacturing Company .....	248
Strong, Carlisle & Hammond Company .....	236
Sturdimatic Tool Company .....	291
Sun Oil Company .....	14-15
Sundstrand Machine Tool Company .....	281
Sunnen Products Company .....	215
Superior Steel Products Company .....	237
Supreme Keyseat Cutters Company .....	290
Syntron Company .....	234

# T

Tamms Industries, Incorporated .....	236
Tap Cartridge Company .....	253
Thomas Hoist Company .....	276
Thriftmaster Products Corporation .....	283
Tietzmann Tool Corporation .....	290-304-305
Tomkins-Johnson Company .....	192
Tree Tool and Die Works .....	10

# U

U.S. Steel Corporation .....	207
------------------------------	-----

# V

Vascoloy-Ramet Corporation .....	86
Veet Industries, Inc. ....	265
Verson All Steel Press Company .....	78
Victor Machinery Exchange, Inc. ....	317
Vlier Engineering, Inc. ....	163
Vogel Tool & Die Corporation .....	270
Vulcan Tool Company .....	55

# W

Wade Tool Company .....	2
Wales-Strippit Corporation .....	230
Walls Sales Corporation .....	300
Walton Company .....	269
Wardwell Manufacturing Company .....	255
Warner & Swasey Company .....	225
Watts Brothers Tool Works .....	304
Webber Gage Company .....	20
Weldon Roberts Rubber Company .....	176
(Brightboy Industrial Division) .....	
Wells Manufacturing Corporation .....	200
Wetmore Tool & Engineering Company .....	269
Wiedemann Machine Company .....	54
Wilton Tool Company .....	323
Wirth & Son Company, Carl .....	272
Wittek Manufacturing Company .....	244
Woods Machine Company, S. A. ....	193

# a PROCUNIER TAPPER pays for itself!

**Built-in features and operating advantages  
increase production—reduce costs!**

Any way you look at it—you save and gain with Procunier Tappers. It is an uncontested fact, when you use Procunier you are enjoying the advantages of the finest tapping heads. Countless reports indicate tremendous savings on taps, automatic production increases, drastic reduction in parts spoilage, less operator fatigue, fewer "down hours" and precision accuracy in threads and tapped holes. Taking these gains and savings into consideration you can quickly see why Procunier heads "pay for themselves in just a short time!"

Procunier heads offer high speed, quiet operation, a new, powerful drive—with finger tip pressure; economical lightness, "long life" ruggedness and an accuracy and dependability you can consistently count upon! And, there's a versatile model for practically every tapping operation.

## Send for FREE Brochure

Find out how you, too, can benefit with Procunier. Get the full construction details—see the many unusual tapping applications—get the "inside story" on why Procunier has led the field for more than 30 years. Write today—now.



**PROCUNIER**  
**Safety Chuck Co.**  
14 S. Clinton St.  
Dept. 6  
Chicago 6, Ill.



**MAIL  
COUPON  
TODAY!**

### PROCUNIER SAFETY CHUCK CO.

14 S. Clinton St., Chicago 6, Ill., Dept. 6

Gentlemen: Please send your illustrated brochure giving complete details, specifications and prices on the improved line of Procunier High Speed Tapping Heads.

Name

Address

City  Zone  State

Circle No. 487 on Card, Opposite Page 65



Use  
**ALLEN  
COLLETS**  
*they're*  
**the BEST..**

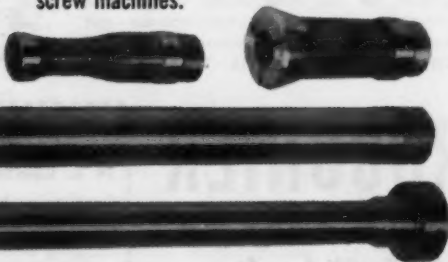
*Here's  
why*

**YOU GET  
Supreme  
PERFORMANCE  
ACCURACY  
CONCENTRICITY  
LONG LIFE**

*We will duplicate*  
**COLLETS  
COLLET TUBES  
PUSHERS and  
PUSHER TUBES**

*Write for  
literature and prices.*

Years of experience assure you the utmost in dependability and precision when you use Allen Collets . . . Machined to exact tolerances, properly heat-treated, rigidly inspected and shop tested, they're "tops" in keeping production up, rejects down. Standard sizes and designs for all makes of automatic screw machines, single and multiple spindle, turret lathes and hand screw machines.



**ALLEN COLLET MFG. CO., INC.**

17720 CLARANN AVE. • MELVINDALE, MICHIGAN

June, 1956

For free information . . . use these postage-free Action Cards

## Free Literature circle key numbers

1	11	21	31	41	51	61	71
2	12	22	32	42	52	62	72
3	13	23	33	43	53	63	73
4	14	24	34	44	54	64	74
5	15	25	35	45	55	65	75
6	16	26	36	46	56	66	76
7	17	27	37	47	57	67	77
8	18	28	38	48	58	68	78
9	19	29	39	49	59	69	79
10	20	30	40	50	60	70	80

## New Products

## circle key numbers

81	91	101	111	121	131	141	151	161	171
82	92	102	112	122	132	142	152	162	172
83	93	103	113	123	133	143	153	163	173
84	94	104	114	124	134	144	154	164	174
85	95	105	115	125	135	145	155	165	175
86	96	106	116	126	136	146	156	166	176
87	97	107	117	127	137	147	157	167	177
88	98	108	118	128	138	148	158	168	178
89	99	109	119	129	139	149	159	169	179
90	100	110	120	130	140	150	160	170	180

Company.....

Name.....

Position.....

Street.....

City.....

Zone.....

State.....

June, 1956

For free information . . . use these postage-free Action Cards

## Advertisements

## circle key numbers

201	226	251	276	301	326	351	376	401	426	451	476	501	526	551	576
202	227	252	277	302	327	352	377	402	427	452	477	502	527	552	577
203	228	253	278	303	328	353	378	403	428	453	478	503	528	553	578
204	229	254	279	304	329	354	379	404	429	454	479	504	529	554	579
205	230	255	280	305	330	355	380	405	430	455	480	505	530	555	580
206	231	256	281	306	331	356	381	406	431	456	481	506	531	556	581
207	232	257	282	307	332	357	382	407	432	457	482	507	532	557	582
208	233	258	283	308	333	358	383	408	433	458	483	508	533	558	583
209	234	259	284	309	334	359	384	409	434	459	484	509	534	559	584
210	235	260	285	310	335	360	385	410	435	460	485	510	535	560	585
211	236	261	286	311	336	361	386	411	436	461	486	511	536	561	586
212	237	262	287	312	337	362	387	412	437	462	487	512	537	562	587
213	238	263	288	313	338	363	388	413	438	463	488	513	538	563	588
214	239	264	289	314	339	364	389	414	439	464	489	514	539	564	589
215	240	265	290	315	340	365	390	415	440	465	490	515	540	565	590
216	241	266	291	316	341	366	391	416	441	466	491	516	541	566	591
217	242	267	292	317	342	367	392	417	442	467	492	517	542	567	592
218	243	268	293	318	343	368	393	418	443	468	493	518	543	568	593
219	244	269	294	319	344	369	394	419	444	469	494	519	544	569	594
220	245	270	295	320	345	370	395	420	445	470	495	520	545	570	595
221	246	271	296	321	346	371	396	421	446	471	496	521	546	571	596
222	247	272	297	322	347	372	397	422	447	472	497	522	547	572	597
223	248	273	298	323	348	373	398	423	448	473	498	523	548	573	598
224	249	274	299	324	349	374	399	424	449	474	499	524	549	574	599
225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600

Inserts: Inside Front Cover 1A 1B 1C 1D Inside Back Cover 2A 2B 2C 2D Back Cover 3A 3B 3C 3D

Company.....

Name.....

Position.....

Street.....

City.....

Zone.....

State.....

FIRST CLASS  
PERMIT NO. 271

WHEATON, ILLINOIS

**BUSINESS REPLY CARD**

NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

**MACHINE and TOOL BLUE BOOK**

READERS' SERVICE DIVISION

WHEATON, ILLINOIS

FIRST CLASS  
PERMIT NO. 272

WHEATON, ILLINOIS

**BUSINESS REPLY CARD**

NO POSTAGE NECESSARY IF MAILED IN THE U.S.A.

3c POSTAGE WILL BE PAID BY

**MACHINE and TOOL BLUE BOOK**

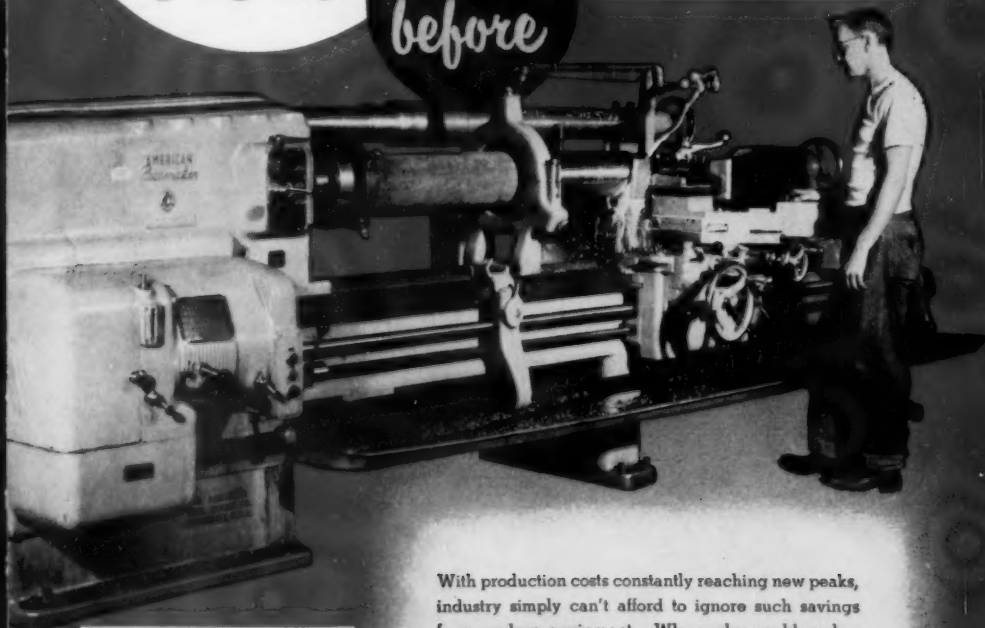
READERS' SERVICE DIVISION

WHEATON, ILLINOIS

# 2¼ hrs. now

# 9 hrs. before

Fairbanks, Morse & Co.,  
Beloit, Wisconsin, is really  
putting the payroll dollar to  
work with its new 20 inch  
"AMERICAN" Heavy Duty  
All-Hydraulic Duplicating  
Lathe.



**2000 horse power  
Fairbanks-Morse motor  
shafts are now being  
rough and finished  
turned in 2¼ hours  
floor to floor against a  
former time of 9 hours  
per shaft.**

With production costs constantly reaching new peaks, industry simply can't afford to ignore such savings from modern equipment. Where else could such a magnificent return upon an investment be secured, and how else can costs be lowered to meet an increasingly competitive market?

More production per man hour is the answer and the only answer to prohibitive costs—modern, high production machinery is the answer to greater production per man hour.

Put your payroll dollar to work for greater profits with "AMERICAN".

*Bulletin No. 35 shows many examples—it's yours for the asking.*

**THE AMERICAN TOOL WORKS CO.**

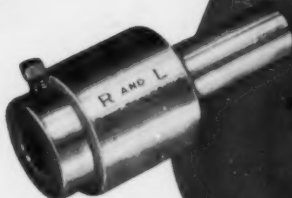
**Cincinnati 2, Ohio, U. S. A.**

**LATHES AND RADIAL DRILLS**

# Cut

# COSTS

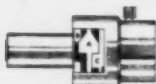
## with R and L TAP AND DIE HOLDERS



*New Release Mechanism  
allows for easy adjustment  
for right or left hand  
tapping and threading.*



Ready to start threading operation, clutch slightly engaged at C.



Instantly engaged to full contact between A and C as soon as tap or die engages work.



Fully released, allowing ample clearance between contact points of clutch.

Instant engagement  
at full contact . . . Fast  
kick out clutch . . . No spring  
plungers to wear or break . . .

No small screws to work loose!

Available with shanks of from  $\frac{5}{8}$ " to  $1\frac{1}{2}$ "  
in releasing and non-releasing types as well as  
releasing die holders for acorn dies.

Send for new  
catalog

**R and L TOOLS**

1825 Bristol Street, Philadelphia 40, Pa.

- ☐ Send new catalog  
☐ Please have representative call.

NAME .....

COMPANY .....

ADDRESS .....

# R and L TOOLS

1825 BRISTOL STREET • PHILADELPHIA 40, PA.

TAPPING TOOL • CARRIER OR MILLER BARRETT • RELEASE IN NON-  
RELEASING TAP AND DIE HOLDERS • RELEASE IN HOLDER FOR ACORN DIE  
UNIVERSAL TOOL DUCT • CUT-OFF PLANE MOUNT • REVERSING TOOL

BB-6-56